The Chemical Age

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The Physicist in Industry

A DICTIONARY definition of an engineer is "an engine maker or manager; one who directs works and engines," but it is high time that the makers of dictionaries revised their ideas. An engineer properly so styled is nothing more nor less than an "applied physicist." Since the engineer came before the physicist, it is difficult for the physicist to gain a foothold in industry unless he calls himself an engineer—or a chemist. This difficulty caused the formation of the Institute of Physics a few years ago, a body essentially similar in outlook to the Institute of Chemistry in its own particular sphere. It is recognised that, taking industry in the mass, the bulk of the operations require far more applications of physics than of chemistry, and this is true even of the chemical industry.

Any of the unit processes of chemical engineering, for example, crushing and grinding, evaporation and condensation, heat transference, the whole range of electrical operations and so forth are essentially physical operations that must be undertaken to produce the products of a chemical reaction in the condition in which they are needed. Yet all these frequently abstruse problems are lightheartedly turned over to the "engineer" for solution, and the control of the physical processes are equally given to the engineer without any thought of employing men who have specialised in pure physics. Yet we do not generally ask engineers to control the course of chemical reactions without guidance from the pure chemist. No doubt it is the underlying fact that the engineer is an applied physicist that brings about this state of affairs. But the chemical and allied industries should bear in mind the considered expression of opinion of industrialists that it is easier to train a physicist to become a competent engineer than to train an engineer to think as a physicist.

An informal discussion on the training of industrial physicists was held a little while ago by the Institute of Physics, a report of which has just been issued. The work of the physicist in industry falls generally into three categories (a) fundamental research having for its object new discoveries or untried ideas and their application, (b) development work consisting of the solution of the numerous small problems and difficulties that arise from day to day in industrial operation, and (c) technical salesmanship. It is generally agreed that at present the scope for fundamental research in industrial physics is not so large as it should be, partly because the number of firms that are sufficiently farsighted to engage in this type of work is small; partly, no doubt, because the study of pure physics in Universities is comparatively rare beyond B.Sc. pass standard so that industrialists cannot grasp the possibilities that might lie behind investigations of this character. It is generally in the newer industries such as those involving electricity that fundamental physical research is appreciated.

There is another and more disturbing reason which is that many British firms are associated with foreign organisations and leave the fundamental research work to their foreign associates. If this should be so it must be regarded as a serious menace to British physics and is likely to result in a decrease in the number of highly-trained physicists which might easily constitute a grave source of weakness to the State. One of the difficulties of the physicist who undertakes work of this character is that the science is divided into compartments, heat, light, sound, electricity and so forth, which may have no interrelationship whatever except in abstruse pure physics.

The physicist for development work is a different pigeon. It would pay any works that can employ half a dozen "chemists" to engage a physicist as one of them and to give him such work as is more suitable to him than to the pure chemist. The report on the discussion justly remarks that the young physicist in industry must be expected to make himself useful in any capacity; in that he is on a par with the young chemist. We are disposed to question whether the physicist, *qua* physicist, is likely to assist much as a technical salesman. If he has that mentality, either he is an exceptional man who should go far, or he is not a physicist. Only in a very few highly technical lines can the pure scientist expect to be a good salesman. Nevertheless, there is a connecting link between the two. The last paragraph in the summary of the report on the meeting ("Journal of Scientific Instruments," May, 1936) is worth quoting *in extenso*: "It is particularly worth noting that almost every industrial speaker emphasised very strongly the importance of personality. Some of them attached more weight to it than to the class which a man attained in his finals. The type of man required was one who could get on easy terms with his fellows, did not irritate by conscious or unconscious airs of superiority, could be friendly with foremen, and diplomatic with directors, and was prepared to study the art of putting his subject to a layman in a form in which it could be assimilated; in fact, as one speaker put it, the sort of man who would be made the captain of a team or the secretary of a club. Sheer intellectual ability is not likely to carry a man far in industrial work if it is not accompanied by those qualities of character which make him readily acceptable to his fellows." That paragraph should be studied by all academically trained men engaged in industry.

Notes and Comments

The Trend of Chemical Invention

FEWER applications for patents were made in this country last year than in any year since 1927, although the number of patents sealed was actually greater than in the two preceding years. In the field of organic chemistry, however, there was a notable increase in the number of applications made during 1935, activity being chiefly displayed in connection with dyes and dyeing, especially leather dyeing, artificial resins, particularly vinyl polymerisation products, chemicals for the treatment of textiles, hormones, photographic chemicals and drugs. In connection with dyeing and other treatments of textiles and leather, much prominence is being given to the use of wetting or surface-tension reducing agents comprising long-chain aliphatic residues associated with other residues capable of yielding surface-tension cations instead of the usual surface-tension anions. The by-products of coal conversion treatments are being investigated as sources of synthetic organic chemicals. The Comptroller-General of Patents, in the 53rd report on the work of his department, points out that the development of synthetic methods of preparing sex-hormones continues, and work of the same nature is being initiated in connection with certain of the vitamins and enzymes. Attention is being directed to the making of india-rubber threads and to the production and treatment of chlorinated rubber for use in coating compositions. In metallurgy, much attention is being paid to the extraction and purification of magnesium and to the preparation of magnesium alloys, to tool alloys of the hard carbide type, and to the heat treatment of metals and alloys to produce or enhance particular physical qualities.

Carboys and Carboy Hampers

ALL those who are connected with the manufacture, transport and use of heavy acids, solvents and similar liquid chemicals, will be interested in the issue by the British Standards Institution of a British standard specification for carboys and carboy hampers. In no sphere of chemical works equipment has there been a greater need for the establishment of a recognised standard. The specification refers to the most usual size of carboy, namely, of 10 gal. nominal capacity, and includes details relating to the shape of the mould in which the carboy is blown, and dimensions for the shape of the neck. In the preparation of this specification the aim of the committee has been to lay down a standard for an article of good commercial quality and reasonable life, without making the requirements so stringent as to result in increased cost of manufacture. Consideration was given to the practicability of including requirements relating to the minimum thickness of the glass and the resistance of the carboy to internal pressure. It was found, however, that at the present time there is no satisfactory method of measuring the thickness of a carboy. Whilst there would be no difficulty in specifying an internal pressure test, it was considered that the results of such a test might be misleading, since a successful test would not be evidence that a carboy was of uniform thickness, or of sufficient thickness. For this reason, the present specification does not include any specific requirements relating to the minimum thickness of the glass, but includes a recommendation as to the minimum thickness which should be aimed at in manufacture. In regard to hampers, the specification includes requirements relating to the materials and methods of construction of hampers suitable for ordinary use.

An Essential Service

IT is just as important to sell a commodity as it is to make it. The British Chemical and Dyestuffs Traders' Association told us so the other day at its annual trade luncheon, and Lord Leverhulme said much the same on Monday when he was elected president of the United Commercial Travellers' Association, though he laid more stress upon the part played by the commercial traveller, whose function it is to satisfy the customer in quality, price and service. The tendency to visualise industry in terms of a competitive struggle has led many people to believe that the trend towards amalgamation will mean less advertising and fewer commercial travellers. The experience of Lever Brothers has, at any rate, been the reverse. The idea that on amalgamation one staff of travellers could do the work of two or three has proved illusory. As much, if not more, is spent by Lord Leverhulme's company on advertising to-day than would have been spent had no amalgamation taken place. The same can be said about the number of sales representatives. The commercial travellers now employed by the firm in the British Isles number 1,859. However industrial conditions may change, the need for commercial travellers will not diminish, for they perform an essential service in the community.

Platinum from the Empire

THE British Empire is now the greatest supplier of platinum and its associated group of precious metals, increasing quantities of which are being employed in the fabrication of specialised chemical plant and for catalytic purposes in the chemical industry. The Mineral Resources Department of the Imperial Institute has published this week the second edition of "Platinum and Allied Metals," which reveals that as regards production the outlook has entirely changed in post-war years. Platinum is found in most parts of the British Empire but not always in commercial quantities. While no platinum has ever been won here, the United Kingdom has always been an important refining and trade centre, and at present practically all the platinum metals produced in the British Empire are refined and marketed by firms in England. In addition, much of the Abyssinian material reaches this country. Canada produced 200,000 oz. in 1934, which appears to exceed that of all other countries put together. The world's pre-war consumption of platinum averaged about 225,000 oz. The year 1932 marked the bottom of the slump, with a consumption of only 75,000 oz. The more normal consumption of about 175,000 oz. in 1933 was due in part to greater demands in certain industrial and chemical fields, and for the first time for many years the amount of platinum used in the industrial arts exceeded that used for jewellery. Consumption in 1935 is estimated to have been about 275,000 oz.

The Rising Importance of Fluorescence Comparisons

By JOHN MUIR, M.A., Director of Research, Radiation Research Laboratory

THE technique of fluorescence analysis has suffered very largely from the extravagant claims which have been made by over-enthusiastic workers in the new field, and when one is asked to give an account of the problems which have been submitted from time to time, and which are particularly of a chemical or allied nature, one is at a loss to know what kind of limitation can be reasonably imposed, because the phenomenon of fluorescence obviously depends on the constitution or construction of the material which fluoresces, and since these properties are chemical or physical or both, one may best perhaps divide the subject by referring to problems which arise in the chemical and allied trades.

In these days when chemical control is coming into its own in the agricultural industry, it is of interest that fluorescence comparisons are effectively used in checking deliveries of feeding stuffs and fertilisers. The bright blue fluorescence of bone meal compared with the dull violet appearance of the calcium phosphates and super phosphates suggests at once a means for the detection of mixtures and of the relative proportion of each constituent present. Although a considerable amount of work has been done in fluorescence of seeds, perhaps the most important application is the detection of mildew or other moulds where these are only at an incipient stage. The Linsbauer method of seed analysis, known as the filter paper method, is a very useful means of differentiation in the examination of both genus and quality.

Checking Building Materials

In the past few years the fluorescence test has been widely applied in the checking of building materials and road-making materials. Stable slags, or slags which do not disintegrate in store, have a dark violet fluorescence on the freshly-broken faces, while after exposure yellowish spots show up on the violet ground. Unstable slags show groups of spots, red, yellow and brown on the violet ground, and Grant reports that brownish spots are considered to be particles of γ-di-calcium silicate. Basic slags are non-fluorescent and raw phosphates can easily be detected in basic slag mixtures owing to the vivid brown or yellow fluorescences which they give. The quantitative examination of asphalts and bitumens for road-making purposes has not been found to be possible, but if the comparative method is employed, very satisfactory results are obtained in comparing consecutive deliveries.

The writer has recently had very useful experience of the testing of synthetic stone and kindred materials, *e.g.*, coloured cement renderings, by alternating exposures to unfiltered ultra-violet light under controlled conditions of humidity and temperature, with the fluorescence comparison with the original. The result has been to give most valuable information as to weathering processes and as to the changes which take place in various types of atmosphere. Glass manufacturers have found out that the fluorescence test reveals the presence of minute impurities in glass, particularly where these impurities are zinc or manganese. The application is obviously of principal importance to manufacturers of optical glass.

Drugs and Fine Chemicals

The manufacture of drugs and fine chemicals provides an excellent opportunity for the use of fluorescence comparisons since drugs either in powder form or in simple solution can be examined either normally or microscopically. Exhaustive work has been done from the earliest days of this test of alkaloids and the documentary accounts are readily accessible. One of the earliest applications of the fluorescence test was in the examination of olive oil, and it is now recognised as a standard test. The yellow fluorescence of virgin olive oil is considered to be due to carotene which is destroyed in the course of the refining process. There are very many theories as to the causes in the particular phenomena which arise in the examination of olive oil, but the practical result is that satisfactory control can be established in a very simple way by this method.

Considerable investigations have been made into the relationship between vitamins and fluorescence with particular reference to the butter and margarine manufacturing interests. It has been stated that the intensity of the yellow fluorescence of milk depends directly on its fat content, although this has not been sufficiently established. It is, however, acknowledged that fresh milk has a yellow fluorescence, sour milk, a whitish fluorescence, while condensed milk, incidentally, has a bluish white appearance under the rays. Changes observed in the manufacture of cheese are of very special interest.

Control of Vinegar Manufacture

The fluorescence test is used in the control of the manufacture of vinegar and in checking the qualities of wines and spirits.

The prompt detection of adulterations of jams and marmalades and other types of preserved fruit is made considerably easier by the use of fluorescence comparison. Further applications which are well established are the examination of fuel oils and lubricating oils where adulterations can be noticed, and the tendency to gumming in lubricating oils.

General application in inorganic chemistry is difficult, because of the poor distinction previously available between subtle fluorescence comparisons. Recent improvements in ultra-violet equipment for fluorescence analysis open up new possibilities in this direction. There is no limit to the applications in organic chemistry, and if the comparative method is employed, each industrial unit can build up its own technique in a very much shorter time than can generally be expected from the application of a new method.

In the manufacture of paper, cellulose derivatives and similar materials, the use of fluorescence comparisons is of immeasurable value because of the rapid detection of any departure from standard during the actual manufacturing process.

It is of importance in all such cases that fresh examples should be kept of normal production. Textile applications and leather manufacturing applications include the study of applied dyestuffs which must be taken as being quite distinct as far as fluorescence comparisons is concerned, from the study of the dyestuffs themselves in their chemical constitution, because it is well known that the fluorescence of a naked dyestuff may been quite distinct from its fluorescence on one or many fibres to which it may be applied.

A More Powerful Lamp Unit

The advent of the electronic discharge tube has made it possible for Hanovia, Ltd., to introduce the Hanovia-Muir analytic lamp which is a more powerful unit for the production of ultra violet rays than any hitherto commercially available for fluorescence analysis. The very much larger filter area enables larger surfaces to be examined, and the convenient mechanism ensures that work can be carried on for indefinite periods without interfering with the quality of the radiation, or the intensity of the fluorescence. The technique of fluorescence comparisons, or as it is more generally described "fluorescence analysis," can only reach logical conclusions in each branch of industry where it may be applied, by the active co-operation of workers in all fields and by frank exchange of methods and results.

Society of Chemical Industry

Programme for the Annual Meeting at Liverpool

THE fifty-fifth annual meeting of the Society of Chemical Industry will be held at Liverpool from July 6 to 10, under the presidency of Mr. W. A. S. Calder. As the meeting follows so closely on the Chemical Engineering Congress, a large number of overseas visitors are expected to attend the Liverpool meeting, the arrangements for which have been made by the Liverpool Section, whose chairman is Professor C. O. Bannister, with Mr. J. S. Towers as secretary.

The programme will open with a reception by the vice-Chancellor at the Liverpool University on the Monday evening. The annual meeting will be held at the University on Tuesday morning, July 7, at 10.45, when Mr. Calder will deliver his presidential address on "The Chemist as World Citizen." The Road and Building Materials Group will hold a session at 9.30 a.m. on July 8, and at 11.30 the Society's Messel Medal will be presented to Sir Robert Mond, who will deliver the Messel lecture on "Works as I have seen them grow." The annual dinner will be held on the Wednesday evening, and the Plastics Group will hold a meeting on July 9, at which Dr. R. Houwink will give a paper on "Synthetic Resins, their Formation, Properties and Possibilities." On the same morning the Food Group will meet jointly with the Royal Sanitary Institute at Southport, where Dr. L. H. Lampitt will deliver his presidential address, followed by a discussion on "Food Package and the Consumer."

There is, as usual, a very full programme of social functions, with pleasure trips for the ladies and a series of works visits for members of the Society. The Tuesday afternoon is to be spent on board the "Franconia," and in the evening the members and visitors will be the guests of the Lord Mayor of Liverpool at a reception in the Town Hall. On the Thursday, I.C.I. (General Chemicals), Ltd., will give a luncheon at the Adelphi Hotel, and in the evening Lever Brothers, Ltd., will give a dinner at Port Sunlight.

The works to be visited during the week include Bowater's Mersey Paper Mills, Ltd., Ellesmere Port; British Insulated Cables, Ltd., Prescot; Lever Brothers' factory, Port Sunlight; Stork Margarine factory, Bromborough; Pilkington Brothers, Ltd., St. Helens; Tate and Lyle, Ltd., Liverpool; Howard Ford and Co., Ltd., Woolton; and Johnson Brothers (Dyers), Ltd., Bootle. A small party will also inspect the ventilating and control stations of the Mersey Tunnel. Friday July 10, will be devoted to a whole day trip to the Dolgarrog Works of the Aluminium Corporation, Ltd., and the Dolgarrog Power Station of the North Wales Power Co., Ltd. Tea will be taken at Llandudno.

Light Hydrocarbon Oil Duty

Industrial Spirit Users to Appeal to Chancellor

INDUSTRIAL spirit users are to sponsor an appeal to the Chancellor of the Exchequer for a rebate on light hydrocarbon oils used for purposes other than road vehicles. The appeal, which will take the form of a proposed new clause to the Finance act of 1928, will be in the name of the Rt. Hon. J. W. Hills, M.P. for Ripon.

The new clause is as follows:—(1) "There shall be allowed from the duties payable on Light Hydrocarbon Oils under Section Two of the Finance Act, 1928, as amended by the Finance Act, 1931, and the Finance (No. 2) Act, 1931, a rebate at the rate of 4d. per gal. on all light hydrocarbon oils which are shown to the satisfaction of the Commissioners of Inland Revenue to have been used for any purpose other than as fuel for mechanically-propelled vehicles constructed or adapted for use on roads. (2) This section shall have effect notwithstanding the preference granted by the British Hydrocarbon Oils Production Act, 1934, to light hydrocarbon oils manufactured in the United Kingdom from coal, shale, or peat indigenous to the United Kingdom."

Spirit users who are sponsoring the appeal are the Paint Federation, Master Painters' and Decorators' Federation, Dyers' and Cleaners' Federation, India-Rubber Manufacturers' Association, Boot and Floor Polish Manufacturers' Association, Wall Paper Manufacturers' Association, White Spirit Association, National Seed Crushers' Association, and the Federation of Bone Users and Allied Trades, representing industries which employ 400,000 to 500,000 people.

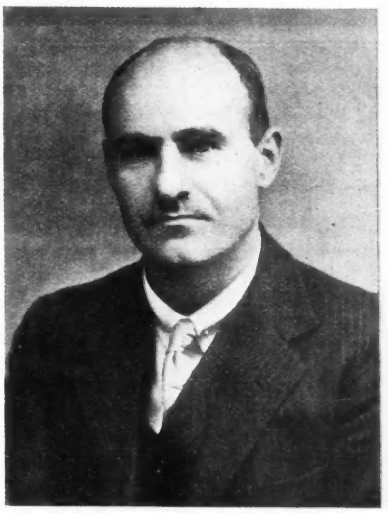
The industrial spirit users feel that a duty which is applied to locomotion should not be applied to an industrial raw material, certainly not to the extent of 8d. per gal. This duty, in some instances, is over 100 per cent. of the cost of the material calculated before the duty was imposed.

A case for amending the light hydrocarbon oil duty was presented during the debate on the Finance Bill in 1935, but it was rejected on the grounds that such an amendment would involve a breach of faith on the part of the Government who, by virtue of the Hydrocarbon Oils Production Act (1934), guaranteed that hydrocarbon oils manufactured in the United Kingdom should enjoy a preference of not less than 4d. per gal. for a period of ten years; that there was possibility of evasion of the duty should the latter be repealed or reduced; and that the position of industrial oils in relation to motor spirit could not be compared to heavy oils used for transport and industrial purposes. Of light oils only 5 per cent. is used for non-transport purposes and 95 per cent. for transport purposes; while where heavy oils are concerned the position is practically reversed—94 per cent is used for non-transport purposes and only 6 per cent. for transport purposes.

Having considered the Chancellor's reasons for rejecting the proposed amendment, the industrial spirit users have reduced their previous request for a rebate of 7d. per gal. on light hydrocarbon oils used solely for industrial purposes to one of 4d. per gal. They consider that the possibility of evasion is no greater where industrial spirit is concerned than it would be where heavy oils used for industrial purposes are concerned. Indeed, in the opinion of the users, there is even less possibility of evasion since industrial spirits are of a different specification from ordinary transport spirit, whereas heavy oils used for transport and industrial purposes are identical and delivered to the same premises for the dual purpose. The special grades of spirit used are controlled by a few suppliers, and their use can be protected by the trade associations representing the users (who are at all times prepared to assist the Customs in regulating supplies and preventing abuses), working in conjunction with the appropriate Government department. The industries concerned are prepared to give any reasonable bond which H.M. Customs may require. The number of firms using industrial spirit is sufficiently small to be easily controlled, and for this reason the industrial spirit users are of the opinion that their case is strengthened by the fact that the Chancellor's estimate of the country's trade shows that only 5 per cent. of the light hydrocarbon oils paying the full 8d. per gal. duty is represented by industrial spirit.

The Design of Vessels to Withstand High Internal Pressures

Dr. D. M. Newitt addresses the Institution of Chemical Engineers



Dr. D. M. Newitt, Ph.D. (London), A.R.C.S., A.I.C., A.M.I.Chem E.

PRESENTING a paper on "The Design of Vessels to Withstand High Internal Pressures," at a meeting of the Institution of Chemical Engineers, held in London on April 22, Dr. D. M. Newitt said the serious application of pressures in the chemical industry did not begin until even after the middle of the 19th century. In 1881, Charles Terrier, in connection with the work on the synthesis of ammonia, had referred to 10 atmospheres as being a high pressure, and presumably in those days 10 atmospheres represented the highest pressure that one could obtain with the apparatus then available. Since that time, however, practical working pressure had increased in quite well-defined steps. There was an increase from 10 to 50 atmospheres, then from 50 to 200, and later from 200 to 1,000 atmospheres; nowadays a number of plants used in the Claude process operate at 1,000 atmospheres, and Dr. Newitt did not think that any conspicuous difficulties were encountered in the operation of those plants.

The use of such high pressures had been rendered possible by improvements in the metallurgy of steel and the development of some high-tensile steels, and had not involved any material alteration in the method of building pressure vessels. The pressure vessel of to-day was very much like one of Cromwell's cannons, being a plain cylinder depending for its strength entirely upon the tensile strength of the steel of which it was constructed. We were, however, on the verge of another big increase of pressure, from 1,000 to 10,000 atmospheres, and that increase would be rendered possible only if we could construct vessels in which the compressive strength as well as the tensile strength of the steel was utilised. It had occurred to him, therefore, that it would be of interest to members of the Institution to give a brief summary of the methods of constructing such cylinders and a brief account of the calcuations necessary in their design.

Elementary Requirements

The elementary requirements of a material for high-pressure work, said Dr. Newitt, are (*a*) high elasticity, and (*b*) a degree of plasticity, which finds expression in the terms ductility, malleability, toughness and hardness. While the former can be measured directly, the latter has to be assessed as the result of tensile (elongation and reduction of area), bending, impact and hardness tests; the two properties, moreover, are closely related, and in any particular high tensile steel they may be varied within limits by suitable heat treatment, increased plasticity being usually obtained at the expense of elasticity.

The selection of a suitable material of construction is influenced by several factors: (1) the working pressure; (2) the size of the plant; (3) the working temperature; and (4) the nature of the process to be carried out. High pressure vessels are usually made from forgings, and their design is based upon a specification of the mechanical properties of the steel which the maker has to meet by suitable regulation of chemical composition and heat treatment. It is in regard to heat treatment of the forging that the principal manufacturing difficulties arise. In particular, large forgings which have to be hardened by air cooling require special care to render their properties homogeneous and isotropic throughout the mass.

In this respect high carbon steels are not entirely satisfactory; even after careful heat treatment their tensile strength is not particularly high and the difficulties of working and manufacture increase progressively with the carbon content. A high carbon steel, however, with a carbon content between 0.43 and 0.48 per cent. had been specified for the construction of commercial gas cylinders, and experience now extending over several years has shown it to be quite adequate for this purpose; on the other hand the working stress in the walls of gas cylinders does not exceed 10 tons per sq .in. and temperature variations are insignificant.

Nickel and Nickel-Chromium Steels

Certain nickel and nickel-chromium steels containing in some cases small quantities of tungsten, vanadium or molybdenum are far superior to the carbon steels in the combination and range of desirable properties. The effect of the addition of chromium and manganese to a nickel steel is to stabilise the solid solution and thus to improve its air-hardening qualities. Molybdenum is even more beneficial in this respect, and the presence of up to 0.6 per cent. of this metal in a nickel-chromium steel not only reduces the liability to imperfect hardening, but also counteracts the softening effect of tempering and the susceptibility of the steel to temper brittleness. The important practical advantage of its use is the regularity with which the results of heat treatment can be reproduced and the absence of mass effect even in large forgings in which the rate of cooling is comparatively slow.

For these and other reasons a suitable specification for a steel to withstand the high stresses set up in pressure vessels would be substantially as follows:— Carbon, 0.25 to 0.3 per cent.; nickel, 2.5 per cent.; chromium, 0.6 per cent.; manganese, 0.6 per cent.; molybdenum, 0.6 per cent.; silicon, 0.15 per cent.; sulphur, 0.035 per cent. (max.); and phosphorus, 0.035 per cent. The variations in the mechanical properties of such a steel with heat treatment are given in Table I, page 514. From these results the elastic limit corresponding with the desired plastic properties of the material can be specified. There should be no difficulty, for example, in supplying a large forging of this material having an elastic limit of 40 tons per sq. in., an elongation of 17 to 20 per cent, a reduction of area of 40 to 50 per cent. and an impact figure of 30 to 40 ft./lb.

Use of Compressive Strength

The principle underlying the design of compound cylinders is the direct use of the compressive as well as the tensile strength of the steel. The construction is such that the inner layers of the walls are initially in compression and the outer layers in tension, the resultant stresses being due to the sum of the initial and working stresses.

The advantages obtained by the application of this principle may best be illustrated by means of some actual examples

taken from cylinders designed for use in connection with the study of liquid reactions at high pressure.

The steel employed throughout was a nickel-chromium-molybdenum steel substantially of the composition given in Table I, but heat treated to give an elastic limit in tension of 60 tons per sq. in. with a Poisson's ratio of 0.3 and a modulus of elasticity of 13,300 tons per sq. in. The limitation is imposed that the internal diameter of the cylinders shall all be 1.25 in. and their external diameter 6 in., and it is required to find the distribution of stresses in the walls when the working pressure is such as to give an equivalent simple stress at the bore of 60 tons per sq. in.

Table I.—Mechanical properties of a Ni-Cr-Mo steel for various heat treatments (*C* 0.27%, *Ni* 2.55%, *Cr* 0.68%, *Mo* 0.62%, *Mn* 0.57%).

Heat treatment. Oil hardened from °C.	Tempered. Temp. °C.	Time hrs.	Mechanical properties. Elastic limit tons per sq. in.	Yield point tons per sq. in.	Maximum load tons per sq. in.	Elongation %	Reduction of area %	Brinell No.	Izod impact (average) ft./lbs.
900	600	2	55	62.6	67.1	19	58	326	38
900	650	2	44	50.0	56.1	24	67	273	55
900	670	2	41	45.0	52.0	25	57	249	60
900	700	2	23	36.4	53.0	24	58	244	60

Average modulus of elasticity = 13,000 tons per sq. in.

Shrinking Two Cylinders together

The radial and hoop stresses set up by shrinkage are due to an external pressure on the inner cyinder and an internal pressure on the outer cylinder; and provided the elastic limit of the steel is not exceeded in either cylinder, their magnitudes will be determined by the initial difference between the bore of the outer and the external diameter of the inner cylinder. This quantity is known as the shrinkage, and for high tensile steels is usually of the order of 0.002 ins. per in. of diameter.

If D_0, D and D_1 are the internal, contact and external diameters of the cylinders after construction, respectively, and V the shrinkage, the bore of the outer tube will have expanded by an amount equal to :

$$\frac{(Ta + \acute{o}\, Pa)}{M} D, \quad \ldots\ldots (1)$$

where P_a is the pressure due to shrinkage and T_a the corresponding hoop tension at the bore.

The outer diameter of the inner tube will have contracted by an amount equal to :

$$\frac{(Tb + \acute{o}\, Pa)}{M} D, \quad \ldots\ldots (2)$$

where T_b is the hoop tension.

The shrinkage V is equal to the sum of these two strains. That is :

$$V = \frac{(Ta + \acute{o}\, Pa)}{M} D + \frac{(Tb - \acute{o}\, Pa)}{M} D = \frac{(Ta + Tb)}{M} D \quad \ldots (3)$$

$$\text{and } Ta + Tb = \frac{VM}{D} \quad \ldots\ldots (4)$$

This quantity is called the " shrinkage force." Both T_a and T_b can be expressed in terms of the pressure P_a and the diameters of the cylinders :—

$$Ta = Pa\left(\frac{D_1^2 + D^2}{D_1^2 - D^2}\right) \quad \ldots\ldots (5)$$

$$-Tb = Pa\left(\frac{D^2 + D_0^2}{D^2 - D_0^2}\right) \quad \ldots\ldots (6)$$

The calculations are considerably simplified if the contact diameter D be taken as the geometric mean of the internal and external diameters, ($D = \sqrt{D_0 D_1}$), when :—

$$Ta = -Tb = Pa\left(\frac{D_1 + D_0}{D_1 - D_0}\right) \quad \ldots\ldots (7)$$

$$\text{and } Pa = \frac{VM}{2D}\left(\frac{D_1 - D_0}{D_1 + D_0}\right) = \frac{VM}{2 D_0 \times x}\left(\frac{x - 1}{x + 1}\right) \quad \ldots\ldots (8)$$

when $D_0 = xD_1$.

The equivalent simple stresses at the various diameters are then obtained by combining the corresponding values of the radial and hoop stresses. Since the radial pressure at the bore and outside diameter of the combined tube are equal to 1 atmosphere only they may be neglected in comparison with the hoop stresses, and the equivalent stresses taken as equal to the hoop compression and tension, respectively.

The expansion or contraction in diameter dD due to shrinkage may be calculated at any diameter D from the equation :—

$$dD = \frac{(T \pm \acute{o}\, P)\, D}{M} \quad \ldots\ldots (9)$$

where P and T are the corresponding values of the radial and hoop stresses at that diameter.

Having found the stresses due to shrinkage, those imposed by the internal pressure are calculated as for a simple cylinder of the same overall dimensions. The algebraic sum of the equivalent simple stresses at the bore due to shrinkage and internal pressure, however, must not exceed the tensile stress of the metal at the elastic limit. The resultant stresses in the compound cylinder due to combined shrinkage and internal pressure are then obtained by summation of the two sets of results.

In the particular example under consideration the internal and external diameters are fixed. The contact diameter is taken as 2.75 in., approximately the geometric mean of the internal and external diameter, and the shrinkage allowance as 0.002 in. per in. of diameter. The shrinkage force is given by Eq. (4) :—

$$= \frac{0.0055 \times 13{,}300}{2.75} = 26.6 \text{ tons per sq. in.}$$

In this case the initial hoop compression at the bore due to shrinkage is only 21.98 tons per sq. in., and theoretically more favourable results could therefore have been obtained by employing a greater shrinkage. Increased shrinkage, however, involves a consideration of the coefficient of linear expansion of the metal and the maximum temperature to which it is desirable to heat the outer cylinder in order to fit it in position.

Shrinking Three Cylinders

The resultant stresses due to the combined shrinkage are calculated on the assumption that the two inner cylinders are first shrunk together, and that the outer cylinder is shrunk on to a simple cylinder of the same dimensions as this built-up cylinder. The stresses due to the two separate shrinkage operations are then summed algebraically.

In the case of a compound cylinder formed by wire or ribbon winding a simple cylinder is externally wound with steel wire or ribbon under tension so that compressive stresses and strains are set up similar to those produced by shrinkage. The winding tension is kept constant and the wire winding is assumed to act as though it were a homogeneous cylinder of the same dimensions.

If R_0 = the internal radius of the tube,
R_1 = the external radius of the tube,
R_2 = the external radius of the wire winding,
P_0 = working pressure.
W = the winding tensile stress,

then at any radius R within the wire winding there will be a pressure p, due to the layers of wire between R_1 and R, tending

to reduce the winding stress W. If the compound cylinder between R_0 and R is regarded as being homogeneous and acted on by an external pressure p, the reduction in hoop tension, t, is given by :—

$$t = W - p\frac{R^2 + R_0^2}{R^2 - R_0^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

Furthermore, it can be shown that

$$p = \frac{W(R^2 - R_0^2)}{2R^2} \times \log_e \frac{R_2^2 - R_0^2}{R^2 - R_0^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

and putting $R = R_1$, the external pressure P_1 exerted in the tube by the winding is :

$$P_1 = \frac{W(R_1^2 - R_0^2)}{2R_1^2} \times \log_e \frac{R_2^2 - R_0^2}{R_1^2 - R_0^2}. \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

The stresses in the inner cylinder due to the external pressure P_1 may be calculated by the method given for simple cylinders. The resultant stresses due to the winding and the internal working pressure are then obtained by summation, it being assumed in calculating the latter that the compound cylinder acts as a homogeneous cylinder of the same dimensions.

(To be continued.)

Methods of Coal Tar Distillation

By H. G. SHATWELL, M.Sc. (Tech), Ph.D.

METHODS of tar distillation used at the Provan Chemical Works, Glasgow, were referred to in THE CHEMICAL AGE, March 28, 1936 (page 285). The author, Mr. R. G. W. Eadie, B.Sc., F.I.C., describes the process by which crude tar is first dehydrated in a Wikner dehydrator, the dry tar being then charged through preheaters or " top-boilers " to intermittent stills for further reduction to pitch or road-tar stock. He claims that by the adoption of this semi-intermittent method, the consumption of fuel necessary to make standard road tars has fallen from 1.02 to 0.94 cwt. per ton of tar distilled and that, in addition, difficulties due to priming have been eliminated and the time of distillation has been reduced by 50 per cent.

On the strength of these and other considerations, Mr. Eadie believes that there are certain good reasons for clinging to the semi-intermittent process in preference to continuous methods of distillation, his main reasons being the following :

(1) It is doubtful whether over long periods of survey, a continuous process can beat the system already outlined on heat-saving grounds.

(2) Continuous plants only give maximum heat efficiency under the standard conditions for which they are designed.

(3) Continuous plants will only show heat economy if kept working; starting up and shutting down is expensive.

These ideas, still largely held in the tar industry, are so contrary to modern experience in the continuous distillation of petroleum, benzol, alcohol, etc. that it is of interest to consider the subject in some detail.

Disadvantages of Pot-Stills

Much of the greater part of the coal-tar manufactured to-day is distilled by methods substantially similar to those employed at the Provan Chemical Works. The crude is boiled in pot-stills which vary in capacity from 8 to 40 tons, distillation being carried through at as high a rate as possible, no attempt whatever being made to fractionate the products as they leave the still.

Recovery of heat from the vapours is practised in a variety of ways. In some works, as at Provan, a preheater or " top-boiler " is superimposed on the still, the preheater being filled with crude or dehydrated tar. The vapours leaving the still pass through coils located in the top-boiler so that the tar therein is heated and partialy distilled before it enters the still as a complete still charge. Another method is to join two or more stills together in series, the contents of one overflowing into the next. Crude tar is fed continuously into the first still, beong heated in its passage thereto by indirect contact with the vapours leaving one or more stills, the final reduction to pitch being usually effected intermittently in other stills.

Despite the fact that shell-stills are employed almost universally in the tar industry of this country, they are known to possess disadvantages, the chief of which are as follows :—

(1) A battery of tar-stills, with attendant condensers fraction tanks, store boilers and pitch coolers, occupies a considerable amount of space.

(2) The quantity of tar in progress at any moment may amount to many tons, and in case of the collapse of a still or of a mistake on the part of a workman, a serious fire can easily occur.

(3) When vertical retort tars are being handled, corrosion of the base of the still is generally very serious. This fact entails constant inspections, and frequent removals of still-bottoms or even of complete stills. Apart from the cost of inspection and repairs, the man-handling of cumbersome, heavy vessels and the re-building of furnace settings, the process of distillation is often disorganised until the new still is ready to take up its part of the work.

(4) The continuous boiling of crude tar in a still for 12 hours or more seriously affects the quality and quantity of the products. Crude tar consists of reactive basic, acidic and neutral compounds together with relatively small quantities of ammonium chloride, hydrochloric acid and sulphur compounds, some of which are capable of catalysing chemical interaction and polymerisation of the tar constituents. The physical and chemical changes thereby induced lead almost invariably to the production of higher yields of residue—pitch and refined tar stock—at the expense of the more valuable distillates.

(5) As previously mentioned, fractionation of the vapours issuing from intermittent or semi-intermittent shell-stills is rarely, if ever, attempted. It would, in fact, be almost impossible to produce narrow cuts, not only because the composition of the liquid in the still is changing rapidly and continuously, but because in the latter stages of distillation a certain amount of thermal decomposition occurs with formation of low-boiling materials. Consequently, the products from the crude tar stills possess extremely long boiling ranges and overlaps are considerable. The result is that subsidiary distillation equipment necessary to convert the crude materials from the tar-stills into finished products is unnecessarily elaborate and extensive and re-running costs are high.

Continuous Distillation

It is for the above and other reasons that tar distillers are turning their attention to other methods of distillation. They cannot, in fact, continue indefinitely to ignore the enormous strides which have been made in the last decade in our knowledge of the fundamental principles of distillation and of the laws of fluid flow in pipes. Neither can they afford to allow the more valuable components of tar to be destroyed by long-continued boiling in shell-stills, nor to disregard the fuel economies which can be secured by means of heat exchange rendered possible by continuous methods of distillation.

It is not the object of this article to advance the claims of any particular patented process of continuous tar distillation. Provided the plant is so designed that the crude tar is in contact with the furnace for a period of time not exceeding two

or three minutes, that the products are fractionated into narrow boiling ranges before they leave the plant, and that efficient heat exchange equipment is included, then the process will be highly attractive from a commercial point of view.

The writer's experience of continuous distillation plant has been gained in the designing and operating of a pipe-still to reduce 1,000 gal. of crude vertical retort tar to refined tar stock per hour together with the operation of a modified pipe-still capable of handling 100 gal. per hour. The former was not supplied with fractionating columns, since its object was solely to replace half-a-dozen 15-ton pot-stills with their attendant overhead boilers and condensing equipment. The question of fractionation was to arise later. The modified pipe-still, however, was fitted with a very efficient modern bubble-cap column and it produced continuously three narrow-boiling distillates and a pitch of marketable quality.

Experience with these two types of equipment led to the following conclusions:

(1) For the same output, a pipe-still with heat exchangers, condensers and fraction and storage tanks occupies less than one-fifth the area of pot-stills with their accessories.

(2) Without fractionation, but producing crude naphtha and oil as distillates and refined tar as residue (Viscosity, Junior Hutchinson, 240 secs. at 35° C.), the consumption of fuel averaged 60 lb. of coal per ton of tar distilled, as compared with 105 lb. average at Provan. With fractionation in the smaller plant, the amount of fuel consumed was not estimated.

(3) Staring from cold, the two plants could be brought on stream within six hours as compared with 4 to 6 hours for a 15-ton shell-still. Consequently, shutting-down and starting-up are only slightly more costly operations with pipe-stills.

(4) The quantity of tar actually in view of the furnace in the large plant was only 110 gal. as compared with 3,000 gal. in a 15-ton shell-still. Fire risks, therefore, were almost negligible since if a tube collapsed, the feed of tar would be stopped immediately.

(5) Although over 25 per cent. of the tubes of the still were located in the radiant heat sector of the furnace in full view of the fire, deposition of coke was of a negligible order because of the fact that the tar was passing through the still in a condition of turbulent flow.

(6) To produce refined tar stock of a particular viscosity, it was found necessary to take off a greater percentage of distillate than was customary with shell-still operations. The exact figure, however, was not capable of ascertainment because of variations in composition of the crude tar though it was generally of the order of 5 per cent. In other words, by pipe-stilling without fractionation, the yield of pitch will be reduced and that of oils increased by about 10 gal. per ton of crude tar.

(7) Lastly, the elasticity of the large pipe-still was proved by the fact that it was subsequently used with complete success to dehydrate a considerable quantity of creosote slurry, a material which contains an average of 40 per cent. of water and which could not possibly be distilled in shell-stills.

The Ideal Plant

There is little doubt in the writer's opinion that continuous methods of distilling crude tar are less costly in initial outlay on plant, are more economical in space and in operating charges and are easier to control than batch or semi-intermittent processes. The ability to introduce fractionating devices is one of the outstanding advantages of a continuous plant because the benefits so gained are felt in every subsequent operation.

The ideal plant would be designed to distil crude tar continuously and to divide it in one treatment into crude naphtha boiling to 195° C., naphthalene oil distilling 195° C. to 225° C. and one or more heavier fractions according to market requirements. Each fraction would be washed separately for acids and bases. The first would give substantially phenol and o-cresol whilst the second would not only yield a mixture of m.p. cresols and xylenols, but would give the whole of the naphthalene originally present in the crude tar. By this means, many laborious refractionations of the tar-acids would be avoided, and, at the same time, a higher production of naphthalene would be assured because it would be concentrated in a comparatively small bulk of oil. From the closely-cut hydrocarbon fractions remaining after removal of acids and bases, commercial grades of solvent and heavy naphthas, benzene, toluene, xylenes, motor-benzol, light and heavy creosotes and anthracene could be prepared with greater ease than is possible by current methods of distillation at the crude tar-stills.

British Chemical Plant Exhibition

Mr. Ramsay MacDonald as Opener

THE British Chemical Plant Exhibition, which is being held at the Central Hall, Westminster, at the same time as the international Chemical Engineering Congress of the World Power Conference, from June 22 to 27, will be opened by Mr. Ramsay MacDonald, M.P., Lord President of the Council, at an official opening ceremony to be held in the Great Hall at 11 a.m. on Monday, June 22. Invitations have been sent to a number of prominent industrialists and representatives of Government departments, and Mr. MacDonald will be supported on the platform by an influential gathering. Invitations to the opening ceremony have also been sent by the managing committee and by exhibitors to other representative purchasers of chemical plant. The managing committee desires it to be known that if anybody interested in the manufacture or purchase of chemical plant has not received an invitation to the opening ceremony, they can obtain one on application to the British Chemical Plant Exhibition, 166 Piccadilly, London, W.1.

The opening will be followed by an inaugural lunch at the Hotel Victoria, Northumberland Avenue, at 12.45 for 1 p.m., at which the principal guest and speaker will be Mr. Ramsay MacDonald, who will make the main reply to the toast of the guests. It is hoped that further replies on behalf of the guests will be made by Dr. Duden, president of the German Chemical Plant Manufacturers' Association, and Dr. C. M. A. Stine, vice-president of Duponts, Ltd., of America. The managing committee has invited as guests to the luncheon a distinguished list of leaders of industry and representatives of Government departments, together with leaders of foreign delegations to the Chemical Engineering Congress. Participation is open to all members of the British chemical and chemical plant industry, irrespective of whether they are members of the British Chemical Plant Manufacturers' Association or whether they are actually showing at the exhibition. Application for tickets, together with the necessary remittance (6s. 6d. per ticket) should be made to the managing committee, British Chemical Plant Exhibition, 166 Piccadilly, London, W.1. The accommodation is limited to 300, and ladies cannot be admitted because of this limitation. Applications for tickets should be made not later than June 15, and it may even be necessary to close the list before that date in view of the way in which tickets are being taken up.

Examples of Oxy-Acetylene Copper Welding

Uses in the Chemical Industry

THE oxy-acetylene welding of copper has been the subject of much research in recent years and is being employed extensively in the construction and repair of chemical plant. In a paper recently given at a Swansea meeting of the Institute of Metals, Mr. L. C. Percival said that as it is not possible to adjust the oxy-acetylene flame characteristic to any advantage in the case of copper, the obvious remedy is to have what has been called "weldable copper," that is, deoxidised copper. Deoxidised copper, although perhaps not always completely deoxidised, in that it may contain traces of oxygen in spite of also containing traces of residual deoxidant, has put copper welding on a proper basis, with the result that full use can be made of the many advantages of welding.

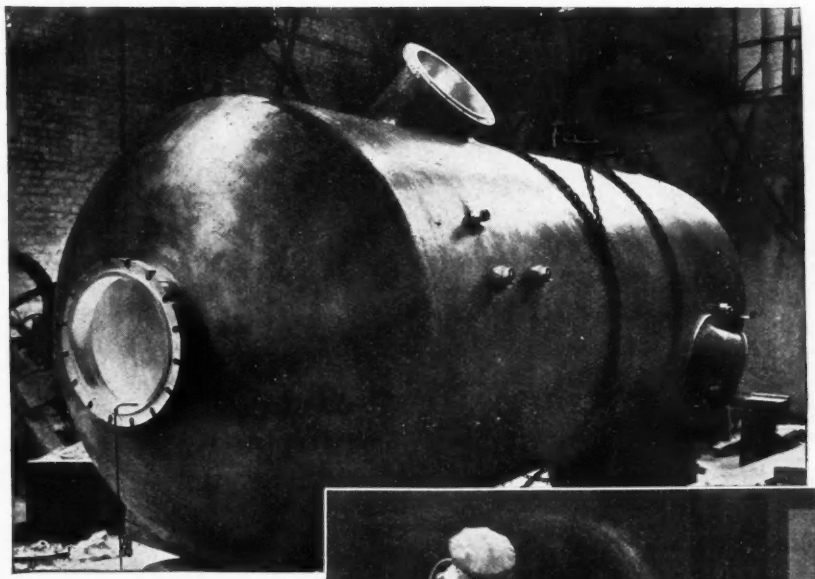
The neutral flame should be used for copper welding, and provided deoxidised copper is used, no "gassing" or other effect will be possible. A flux of the "borax mixture" type is used in the welding of copper. The choice of a welding rod for oxy-acetylene welding copper varies with the individual. Some users prefer a rod containing a simple deoxidant, such as phosphorus or silicon, others prefer a copper rod containing also a small percentage of silver.

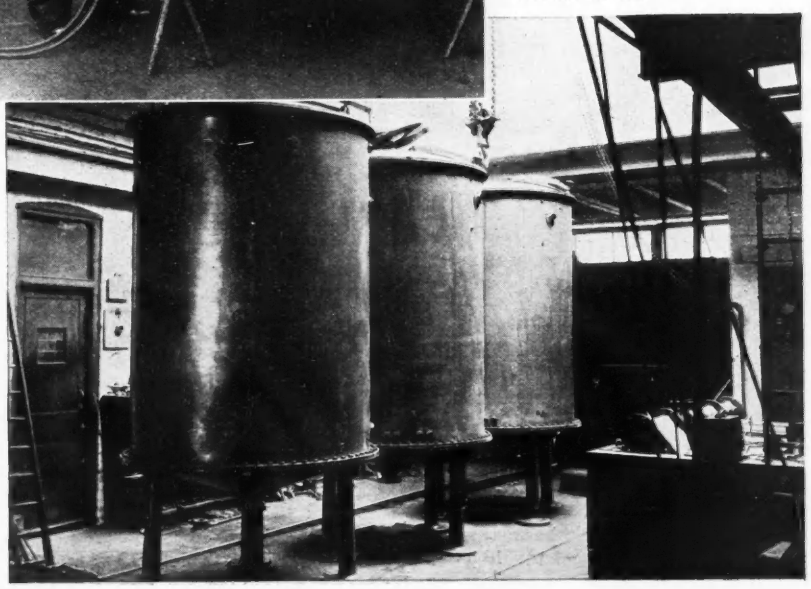
Small percentages of silver result in a more fluid weld-metal, and the tensile strength of the weld-metal is increased, and the annealing or softening temperature is also slightly increased. Fundamentally, however, a copper welding rod is designed to deposit sound weld-metal as pure as possible.

A practical manner in which to test the suitability of copper for oxy-acetylene welding is to heat a sample piece to welding heat by means of the oxy-acetylene flame, and at once hammer it until the metal is forged down and spread considerably. If this can be done without the copper showing cracks, the copper can be taken as being suitable for welding. There are laboratory tests also, such as microscopic examination for the detection of cuprous oxide, and heating a copper specimen to at least 800° C. in an atmosphere of hydrogen, and then subjecting the copper to cold bend tests.

Welds in deoxidised copper welded with copper welding rods can give tensile strengths varying from 10.5 to 13.5 tons per sq. in. in the "as welded" condition.

Welds hammered at red heat give slightly better results, and cold-hammered welds remain intact.





(Above) Welded Copper Tank, 18ft. long, by 5 ft. diameter. Constructed of ⅜ in. copper sheet.

(Centre) Welding a Copper Boiling Pan for Acetic Acid.

(Below) Welded vertical Copper Tanks, 5ft. diameter by 6 ft. 6 in. high.

Russian Soap Industry

Fat Splitting and Glycerine Recovery

BEFORE the war there were in Russia about 780 soap-works, producing nearly 200,000 tons per annum, but only twelve of these were of any considerable size, and accounted for about 60,000 tons of the total output. During and immediately after the war, that is to say up to about 1921, soap manufacture in Russia declined very considerably, down to something like 5,000 tons per annum; but in 1922 the industry began to show signs of recovery, and some of the larger works restarted manufacture, after being closed down for a time. Since 1925 most of the older works have been thus reinstated and many new ones have been built. These latter have included not only purely soap-making plant, but also installations for oil-milling, seed-crushing, oil-refining, fat-splitting and glycerine recovery, and fatty acid distillation and synthesis, as well as fat-hardening or hydrogenation.

Valuable Work in Many Fields

The amount of scientific research undertaken in Russia has been remarkable, and the pages of the Russian technical journals bear witness to a great deal of valuable work in many varied fields. The synthesis of fatty acids, for example, from hydrocarbons (paraffins) has been established on a large scale manufacturing basis. The factory recently started up at Kasan for the synthesis of fatty acids from petroleum products is said to have produced at least 2,000 tons last year; and another large works will shortly start up at Gorki, near Nijni Novgorod. It is confidently anticipated that the total output of synthetic fatty acids from these two factories, when working to full capacity, will be at least 20,000 tons per annum.

In another interesting department, that of soap fillers, a large programme of research is being intensively pursued, especially in connection with the use of china clay. Large claims have been made for many years past in regard to the use of this clay and of bentonite as a soap constituent; they have been frequently regarded as something more than soap fillers or adulterants, constituting a valuable addition to the fat charge, adding to the detergent power and other qualities of the soap, and, of course, cheapening production. Some of the latest work in Russia would seem to indicate that strongly adsorbent colloidal materials of this nature are not in all cases so valuable as less adsorbent substances, and kieselguhr, for instance, has been suggested as preferable to kaolin. This needs confirmation, no doubt, and further work is in hand. Since Russia now possesses important deposits of china clay of her own, near Moscow, it is evident that serious attempts will be made to utilise these to the best purpose, in soaps, cosmetics, paints, and for other purposes.

Naphthenic Acids and Derivatives

Naphthenic acids and derivatives have for many years occupied the attention of Russian chemists in the soap manufacturing and other industries, and research in this field is also being continued. One particular form of these acids, known as Acidol, was only used to the extent of 3,000 tons before the war. In 1935 no less than 16,000 tons were used in soapmaking alone. Other raw materials include 14,000 tons of soapstock, nearly 5,000 tons of fish and marine animal oils, and about 16,000 tons of Russian rosin.

The most recent estimates of soap production in Russia indicate that, during the last year or two, the older factories have produced a little more than 200,000 tons of household soap and 45,000 tons of toilet soap; whilst the new works have accounted for nearly 300,000 tons of household soap and 11,000 tons toilet soap. These figures apparently only refer to the large-size factories; if all the smaller ones be included then the estimated output for 1936 should be 600,000 tons and 60,000 tons respectively. Before the war only a comparatively few of the soapworks had fat-splitting plants or bothered much about glycerine recovery. All new works and many of the older ones now have plant for the production of glycerine. A further important consideration is that nearly the whole of the machinery and apparatus required in the soap-making and allied industries is now manufactured in Russia, mostly at the two great engineering works, "Transmission" in Moscow and "The Red Torch" in Kasan.

Drug Control in India

A Plea for Government Action

IN view of the extensive trade in adulterated and spurious drugs in the Indian market, the Bombay Chemists' and Druggists' Association and similar bodies all over the country have demanded immediate and effective legislation for the control of drugs. The Indian Drug Inquiry Committee which reported in 1931, collected evidence which showed that India was the dumping ground for every variety of quack medicines and undulterated drugs manufactured in other parts of the world, while reputable firms took extreme care to put only pure products on the market, spent large sums on research, and employed well-trained chemists for the purpose.

It is urged that there should be central legislation for the country as a whole and that control should be for those drugs included in the British Pharmacopoeia and other known and approved medicinal preparations, whether indigenous or not. The Drug Inquiry Committee has further proposed that a central laboratory should be established as well as provincial laboratories, to carry out research, to undertake commercial tests, and to prepare and maintain stable standards of strength, purity and quality of drugs.

The report, presented five years ago, is still under the consideration of the Government, and it is urged that a suitable Bill for the control of drugs should be introduced immediately.

New Standard Specifications

Varnishes and Linseed Oil

FURTHER progress in review of the British Standard specications for paint and paint ingredients is indicated by the issue of revisions of specifications for oil varnishes. The specifications which cover interior, exterior, flatting or rubbing and extra hard drying oil varnish were originally issued separately as British Standard Specifications Nos. 256, 257, 258 and 274 respectively, but they have now been embodied in a single publication. A number of minor modifications have been made to the wording of the clauses of the specifications so as to make them clearer.

The British Standards Institution has also recently issued revised standard specifications for refined raw and boiled linseed oil for paints. These were originally published separately as British Standard Specifications Nos. 242, 243 and 259 respectively, but they have now been grouped in a single publication so as to make them more readily available. The specification for raw linseed oil is identical to the one which has recently been issued for raw linseed oil for general purposes. The specifications for boiled oil and refined oil follow the same lines as the revised raw linseed oil specification.

Copies of these publications may be obtained from Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d. each, post free.

Letter to the Editor

Ophthalmic Treatment for Workers

SIR,—My attention has been drawn to a notice in THE CHEMICAL AGE of May 16, that the Joint Council of Qualified Opticians is about to urge the addition of ophthalmic treatment to the usual staff welfare service and that certain chemical works have expressed their approval of the principle, a widespread adoption of the scheme being hoped for.

The scheme is presumably one sponsored by the Joint Council of Qualified Opticians, and is seems desirable to explain that this organisation is representative of sight-testing opticians without medical experience. The view has been expressed in the reports of three Government inquiries of recent years into the question of sight-testing by non-merical personnel that the ideal form of eye treatment and examination can be secured only by recourse to specially qualified medical practitioners. The eyes are living members of the body, affecting and affected by the bodily health and condition—a doctor alone has the medical knowledge and experience necessary to diagnose and treat any bodily defect which may be causing or caused by defective sight.

It was with the object of providing for the community of limited means this medical eye examination and accurate and properly fitted spectacles at low inclusive charges that the National Eye Service was established by the National Ophthalmic Treatment Board. All insured persons under the National Health Insurance Acts, their dependants and persons of like economic status are eligible for this "medical" eye service and the board already carries out on behalf of welfare committees in various industrial organisations the examination of the sight of workers and the supply of correcting glasses where these are prescribed. I shall be happy to send full particulars of the service to anyone contemplating the addition of ophthalmic treatment to their staff welfare service.—Yours faithfully,

E. G. HARWOOD,
General Secretary.

National Ophthalmic Treatment Board,
1 High Street, Marylebone, W.1.

Society of Glass Technology

Machines for Glassware Finishing

THE last ordinary meeting of the Society of Glass Technology for the current session was held at Birmingham on May 20, the president, Mr. Bernard P. Dudding, being in the chair. Professor W. E. S. Turner (hon. secretary) reminded members of the International Congress on Glass to be held in London and Sheffield, July 2 to 11.

Mr. E. Venis (Osram G.E.C. Glass Works, Wembley), in a paper on "Glassware Finishing Machinery with Special Reference to Tableware," described the many and varied machines which had been devised for scoring and cracking off the moils from fully annealed glass banks. He explained how the scoring must form a cleavage, not merely a mark which might be glazed over by the flames. Moreover, blunt diamonds caused microscopic cracks which might be ground out, but which might develop. With tungsten tools greater pressure was required for effective scoring than when a diamond was used. Scoring followed by cracking could be modified with advantage in some cases, the ware being passed first through the burners, then coming into contact with a diamond or preferably a wet carborundum wheel.

The original method of hand grinding on stone was slow and expensive, and had been successfully replaced by the use of a flat iron wheel covered with carefully graded sand, carborundum flour, or, better still, by 3F grade aloxite powder. Bevelling and glazing processes were dealt with at some length. Other processes dealt with by the speaker were the burning off of moils in contrast to cracking off; the grinding and polishing of pressed ware; the concave bottoming of tumblers; ornamentation by burning in bands of colour, or by fluting, grinding, etching, engraving or cutting; fire-polishing; acid-polishing; and final washing.

Dealing with "Schools and Glass Decorative Art in Czechoslovakia and Germany," Professor W. E. S. Turner briefly reviewed the work which was being carried on at Steinschönau, Haida, Zelezny, Brod, Prague and Hradec Králové for the training of boys and girls in glass decoration. In this respect, and in view of their relative populations, Czechoslovakia could probably be regarded as somewhat ahead of Germany, while both these countries were ahead of Great Britain.

In Germany there existed somewhat the same type of organisation of glass trade schools and industrial art schools. At Stuttgart the section of the Kunstgewerbeschule under Professor von Eiff was doing notable work in the training of designers and decoration of glass. Protessor Turner showed a number of illustrations of the exquisite work of Professor von Eiff. In general, to-day, the demand was found to be for a simpler, cheaper type of ware as in this country. It was obvious that the standard of training in design and decoration of glass achieved in these competitive countries was very high.

British Oxygen Co.'s Headquarters

Removal to Thames House

THE British Oxygen Co., Ltd., has recently transferred its head offices from Victoria Station House to more elaborate and commodious premises at Thames House, Millbank, thus becoming a near neighbour of Imperial Chemical Industries, Ltd. Nearly 500 guests inspected the new offices, which occupy the whole of the first floor of the southern section of the building, embracing a total area of 37,000 sq. ft., on May 28, and were afterwards entertained by the directors to luncheon at Grosvenor House, Park Lane. Dr J. Donald Pollock, chairman of the Company, presided, and extended a cordial welcome to all the visitors.

Lord MELCHETT, responding to the toast of the visitors, proposed by Mr. P. B. Liversidge, congratulated the company upon its remarkable progress, as evidenced by the growth of its capital from £75,000, thirty years ago, to £3,500,000 to-day. The British Oxygen Co., he said, was one of the most advanced scientific companies of our time, and had done a tremendous amount of work for the advancement of science in its own particular line of industry. It had made particularly great strides in the development of welding. Like the company with which he was associated, the British Oxygen Co. was an imperial concern and it afforded a striking example of that energy in bringing together the industrial powers of our Empire which was altogether too much neglected to-day.

Captain Sir MALCOLM CAMPBELL also responded to the toast and referred to the great contribution the company had made, through the development of welding, to the progress of the motor car industry.

Lord ALNESS proposed the toast of the company, and the chairman briefly responded.

The new head office is symbolic of the progress made by the company from modest beginnings fifty years ago. From 1886 to 1921 the head office was situated at the premises in Horseferry Road, where the company's first plant was installed for the production of oxygen. In 1921, the head office was transferred to the building, then newly erected at Edmonton, which to-day houses extensive plant for the production of machines and equipment for use in applying, to the needs of industry, the gases produced in numerous factories throughout Great Britain and Northern Ireland and the Dominions. In 1933, the head office was again removed to the more convenient centre of Westminster, where it was established at Victoria Station House in offices which had, for some years, been occupied by Allen-Liversidge, Ltd., merged with the British Oxygen Co. in 1931.

The Achema Annual

To be Published this Month

THE "Achema Annual," 1935/1936, will be ready for distribution towards the middle of June. The book will contain in three languages (English, French and German) a complete list of all chemical apparatus, machines, equipment and accessories exhibited at the Achema VII—Chemical Engineering Show—Cologne, 1934. In a technical and industrial section, which will also be printed in three languages, the "Annual" will contain detailed reports on recent advances and extraordinary technical innovations made in the field of chemical engineering. As a supplementary section, the new "Annual" will contain the first advance notices informing the public about the great Achema VIII—Chemical Engineering Show—Frankfort-on-the-Main, which will take place from July 2 to July 11, 1937, on the occasion of the fiftieth general meeting of the Society of German Chemists. The book will be sent free of cost to the readers of THE CHEMICAL AGE upon receipt of three international reply coupons to cover postage expenses, addressed to Deutsche Gesellschaft für chemisches Apparatewesen E.V., Hauptgeschäftsstelle Berlin W 35, Potsdamer Strasse 103a.

Some Scientific Advances

Exhibits at the Royal Society's Conversazione

RECENT developments in a number of branches of science were illustrated at the annual conversazione of the Royal Society at Burlington House on Thursday in last week.

Sir Robert Hadfield, F.R.S., had a number of metallurgical exhibits, including a self-recording dilatometer, invented by Professor Sato, of Japan, which had not previously been seen in this country. The apparatus automatically records changes of dimensions of metals and alloys with temperature. The advantages of nickel-steels were shown by several specimens. Sir Robert Hadfield also showed a traveller's compass combined with a sundial, made about 1700.

Sir Patrick Laidlaw, F.R.S., and Dr. W. J. Elford illustrated their discovery in London sewage of two new filterable organisms, which was the subject of a recent paper read before the Royal Society. Specimens of Chinese glass dating from 600 B.C. were shown by Dr. C. G. Seligman, F.R.S., Mr. H. Beck and Dr. P. D. Ritchie; it has previously been held, on the authority of the "Annals" of the Wei dynasty, that the art of making glass was introduced into China in the fifth century A.D. by travellers from the West. Dr. A. Farkas and Professor L. Farkas illustrated methods for the analysis of heavy hydrogen and heavy water.

The Blackburn Network Calculator, an instrument for determining the distribution of the voltages and currents in an alternating current network, was another interesting exhibit. The methods used may be applied to general calculations involving complex numbers or vector quantities and the determination of stresses in structural frameworks.

Progress of Welding

Sir Alexander Gibb Reviews some Achievements

SIR ALEXANDER GIBB, in his presidential address to the annual general meeting of the Institute of Welding in London last week, said the shipbuilding industry had maintained the rate of extension of electric arc welding to naval construction, and both the scope and amount of welding had been further expanded.

The ships in course of construction for the British and foreign Admiralties showed a still greater advance in welding class by class. The destroyers and cruisers, consisting of both mild and alloy steel, galvanized and black, had a large proportion of their structures welded, inclusive of recent cruisers with a proportion of welded shell. The new aircraft carrier at present under construction showed a marked advance in welding over any previous type.

Electric-arc welding had been used to a considerable extent on the steelwork of the Bank of England. The new entertainment hall at Bexhill was the largest all-welded building in this country. An all-welded power and turbo blower house had been erected at the Clyde Iron Works by the Colville Constructional Co. The welded steelwork had been completed of the first section of an eight-storey block of 940 flats at Leeds. All-welded barges, trawlers and tankers had been constructed during the past year, and, of these, the "Franquelin"—a tanker built by Swan, Hunter and Wigham Richardson for Canadian owners—was the largest all-welded ship built in this country.

The use of electric-arc welding for the purpose of fabrication had been gradually increased by the British railways. In various directions there had been much progress in the application of welding to heavy machinery.

Lawn Tennis Tournament

First Round Progress

COMPETITORS in the first round of THE CHEMICAL AGE Lawn Tennis Tournament are reminded that Monday next, June 8, is the last date for playing off their matches, and results must be in the hands of the Editor by the first post on Tuesday morning, June 9. The draw for the second round of the tournament will take place on Tuesday, and particulars will be published in THE CHEMICAL AGE on Saturday, June 13. The indifferent weather of the past week may have delayed some matches being played until the last possible date, in which case it would facilitate the work of the organisers if results are telephoned to the Editor of THE CHEMICAL AGE at the very earliest opportunity.

In addition to the first round results published last week, the following have now been received:

SINGLES

G. A. Hanson (Whiffen and Sons, Ltd.) beat E. H. M. Badger (Gas Light and Coke Co., Ltd.), 6—3, 6—0.

A. J. Truslove (Johnson Matthey and Co., Ltd.) walk over. T. C. S. Bloxam (Le Grand Sutcliff and Gell, Ltd.) scratched.

J. Hudson (Bakelite, Ltd.) beat A. S. Lewis (Stafford Allen and Sons, Ltd.), 5—7, 6—1, 7—5.

A. Baxter (United Yeast Co., Ltd.) walk over, J. Haines (Anglo-Iranian Oil Co., Ltd.) scratched.

F. G. Crosse (Society of Chemical Industry) walk over, A. S. Marcar (Bovril, Ltd.) scratched.

DOUBLES

Preliminary match: H. A. Steel and D. H. Jaffe (Society of Chemical Industry and Lever Bros., Ltd.) beat J. I. T. Jones and R. M. O. Williams (Mond Nickel Co., Ltd., and Chance and Hunt, Ltd.), 4—6, 8—6, 6—3.

F. O'Connor and E. D. Lacey (Murex Welding Processes, Ltd.) beat J. Eager and J. H. W. Turner (Griffiths Bros. and Co. (London), Ltd.), 6—2, 6—3.

C. C. Gough and T. P. Williams (Lever Bros., Ltd.) beat E. J. Allday and J. W. Parkes (Bakelite, Ltd.), 6—2, 6—1.

J. H. Bennitt and J. E. H. Hayward (Bakelite, Ltd.) beat G. Barnet and H. H. Ball (Bakelite, Ltd.), 6—3, 8—6.

C. T. Woodcock and V. Hardern (British Tar Products, Ltd.) beat E. Whittaker and H. C. Taylor (A. C. Wells and Co., Ltd., and H. C. Taylor), 6—2, 6—2.

FRENCH dye consumption in 1935 maintained the 1934 level of approximately 8,200 metric tons. Although consumption has declined since 1926, imports have remained on practically the same level, at present in the neighbourhood of 1,200 metric tons, as compared with 1,400 metric tons in 1926. French dyestuffs producers have made every effort to increase their exports, which in 1934 totalled 3,900 metric tons, and in 1935 these were maintained at 3,400 to 3,500 metric tons.

Personal Notes

MR. W. A. S. CALDER will preside at the fifty-fifth annual meeting of the Society of Chemical Industry at Liverpool from July 6 to 10, and will devote his presidential address to the subject of "The Chemist as World Citizen."

Mr. W. A. S. Calder.

MR. A. J. DE HAILES has been advised by his doctor to retire from active professional work as a consulting chemist, and his practice is therefore being taken over by Mr. T. McLachlan, who was associated with the late Mr. C. H. Cribb for some years before his death. Two practices of well over fifty years' standing will therefore now be united.

DAME EMMA CLARKE BEILBY, of 29, Kidderpore Avenue, Hampstead, London, N.W., widow of Sir George T. Beilby, F.R.S., left £166,930, with net personalty £158,418.

DR. ALEX. MACGREGOR, B.Sc., Ph.D., Muirdrun, Carnoustie, has received an appointment as a research chemist with the Universal Grinding Wheel Co., Ltd., Stafford.

VISCOUNT LEVERHULME was elected president of the United Commercial Travellers' Association of Great Britain and Ireland at its conference on Monday.

SIR CHRISTOPHER and LADY CLAYTON lent the grounds of their residence, Crabwell Hall, Mollington, on Wednesday, for a garden party, for the purpose of raising funds to provide the village school with new heating apparatus.

MISS E. WARHURST, the secretary of the Associated Learned Societies of Liverpool and district, has been appointed as official delegate to the conference of the British Association at Blackpool in September.

SIR FREDERICK JONES has died at his residence at Irnham Hall, Corby, near Grantham. Among many directorships he held were those of the United Steel Companies, Ltd., Appleby-Frodingham Steel Co., Ltd., and United Coke and Chemicals, Ltd.

MR. A. E. POLLARD, the British Trade Commissioner at Nairobi, is in this country on an official visit. He will be available at the Department of Overseas Trade from June 10 to 12 for the purpose of interviewing manufacturers and merchants interested in the export of United Kingdom goods to British East Africa (Uganda Protectorate, Kenya Colony and Protectstrate, Zanzibar and Tanganyika Territory), after which he will visit a few of the more important industrial centres in the provinces.

MISS A. B. JACK, representing the Scottish Council of Women Citizens' Associations, moved a resolution at the annual conference of the Scottish branch of the National Smoke Abatement Society at Clydebank on May 29, that the Scottish National Development Council should direct its attention to getting coal carbonised at the pithead to provide smokeless fuel for domestic uses, and to obtaining oil from British coal for the use of the Navy, and cheap gas for local authorities. The resolution was passed unanimously.

MR. CHARLES R. WALKER, president of Scottish Fertilisers, Ltd., a native of Glasgow, has died at Welland, Canada.

Mr. N. REYNOLDSON, proprietor of the Lunehead barytes mine, has died at his home at Brough, Westmorland.

COLONEL S. J. M. AULD will speak on "Gas Warfare and the Petroleum Industry," at the monthly luncheon of the Oil Industries Club, to be held on Tuesday, June 9, at the Great Eastern Hotel, London, E.C.2, at 1 p.m.

SIR FREDERICK JOHN NORMAN, of Runcorn, a specialist in chemistry as applied to colour and earthenware, and late manager of Wiggs' Chemical Works, Runcorn, left gross estate of the value of £78,353 with net personalty £74,404.

MADAME JOLIOT, the daughter of the late Madame Curie, with her husband, lectured on Friday at the Wigmore Hall, London, on the synthesis of new radio-active elements. Professor and Madame Joliot were jointly awarded the Nobel Prize for Chemistry for 1935.

Mr. A. W. FISHER, a former director of the Perth firm of J. Pullar and Sons, Ltd., dyers, who is secretary of the British Direct Mail Advertising Association, left last week to take up an appointment as advertising and sales manager of Beckett's of Birmingham, dyers and cleaners, which controls fifty shops in the Birmingham area.

SIR HENRI DETERDING, general managing director of the Royal Dutch Petroleum Co., celebrated his seventieth birthday on May 30. The boards of Royal Dutch and Shell Transport presented him with a gold cup set with jewels. On Tuesday Sir Henri was married to Frl. Charlotte Minna Knaack, at the Amsterdam Town Hall.

SIR NOWROJI SAKLATVALA, chairman of the Tata Iron and Steel Co., sailed from Bombay for England on May 30. It is reported that he is making the voyage for reasons of health, but it is anticipated that while in England he will discuss the question of merger of the Indian iron and steel interest.

MR. B. U. DEWAR, vice-president of the Federation of British Industries, who has returned from a holiday visit to the United States and Canada, says that American manufacturers have enormous progress in the higher qualities of alloyed steel, largely due to the large amount of research work carried on. In his opinion, American firms allow far more money for research work than British firms do, and it certainly pays them. The greatest advance, he thought, had been made in rolling mill work. In the actual manufacture of steel ingots British manufacturers had not much to learn, but in the manipulation of the steel after it had been made they had an enormous amount to learn from the American.

Chemical Matters in Parliament

Oil Extraction from Cannel

IN the House of Commons on May 28, Lieut.-Colonel Moore asked the Secretary for Mines whether his attention had been called to the possibilities of extracting tar and motor spirit from cannel; and whether he would consider the desirability of financing research into this matter with a view to establishing such extraction on a commercial basis in this country.

Captain Crookshank, in reply, said that the possibilities of extracting tar and motor spirit from cannel coal were well known. Certain investigations had recently been carried out in Scotland into the use of cannel coal in continuous vertical retorts at gas works. The Department of Scientific and Industrial Research had been associated with these investigations and the results had been made available in a report just presented to the Institution of Gas Engineers.

Continental Chemical Notes

France

ACCORDING to M. Pouchet, acetyl moniodosalicylic acid slowly gives off iodine in the body and is recommended for treatment of all rheumatic and neuralgic ailments.

A NEW paint and lacquer making concern has been registered under the style of S. A. Lacques Perrin (60, rue de Paris, Boulogne-sur-Seine (Seine)) with a capital of 550,000 francs.

To increase the yield of volatile hydrocarbons during low-temperature carbonisation of low grade coal (*e.g.*, lignite) it has been proposed to include 2 per cent. calcium carbide with the batch.

AMONG the organic arsenic compounds which have recently been examined for their therapeutic action are the cacodylates of the alkaline earth and heavy metals," reports M. R. Tiollais "Bull. Soc. Chim.", 1936, p. 70). Calcium cacodylate, easily prepared by treating calcium carbonate with cocodylic acid, is extremely soluble in water; barium cacodylate, similarly obtained by reacting barytes with the free acid, is the starting point for preparation of magnesium, iron and cobalt.

THE remarkable solvent action of certain perchlorates on cellulose derivatives has been recently investigated. According to Mme. A. Dobry "Bull. Soc. Chim.," Feb. 1936, p. 312), perchlorates of calcium, magnetism, copper and zinc in saturated aqueous solutions dissolve secondary cellulose acetate in the cold. Thus a magnesium perchlorate solution containing 75 gms. of anhydrous salt per 100 c.c. dissolves cellulose acetate as readily as does acetone. When mixed with water the acetate is precipitated in a porous form. Cellulose itself is insoluble in the above-mentioned perchlorates but is soluble in beryllium perchlorate which is easily prepared by dissolving the metal in perchloric acid or by reacting beryllium suphate with barium chloride.

From Week to Week

TWENTY-THREE Nottingham transport drivers employed by Boots Pure Drug Co., Ltd., have been awarded the National Safety First Association's medal for five years' freedom from accidents.

SIR ROBERT WALEY COHEN, chairman of the Anglo-Egyptian Oil Co., Ltd., informed the shareholders at the annual meeting on Wednesday that the board had decided to accept an offer to participate in a proposed search for oil in an area which was in British territory.

AN IMPORTANT DEVELOPMENT in the West of Scotland steel industry will shortly take place, when surplus blast-furnace gas from the Clyde Iron Works will be utilised in the Clyde Bridge Steel Works nearby. This will be the first adaptation of the kind in Scotland. Both works are owned by Colvilles, Ltd.

A NEW TECHNICAL COLLEGE FOR BIRMINGHAM costing, with the site, approximately £1,000,000, is in prospect. The City Education Committee has recommended a start on the first instalment, which covers about two-thirds of the building at an estimated expenditure of over £500,000. The site adjoins the new fire station which the Duke of Kent opened in December.

JOHN MONCRIEFF, LTD., glass and ink manufacturers, Perth, are to close their ink and sundry packing department. The decision throws about a score of people out of work and will take effect from June 30. Some of the workers affected have had long service with the firm, amounting in one or two instances to over 40 years.

MR. C. S. GARLAND, presiding at the statutory meeting of Stream Line Filters, Ltd., in London on Tuesday, said the profits for the last half-year of the old company amounted to £10,095. Since the conversion into a public company there had been a further steady increase in business. The value of orders in each of the past two months was more than 80 per cent. above those for the corresponding months of 1935.

THE BRITISH CHEMICAL PLANT MANUFACTURERS' ASSOCIATION has issued its official directory for 1936, containing a list of members of the Association, a classified list of their products and services and a list of proprietary and trade names and marks. In a foreword, Mr. J. H. G. Monypenny, chairman, remarks that the very small number of items of chemical plant which are nowadays permitted to enter the country free of duty under the licensing scheme of the 1932 Finance Act is adequate testimony to the competence and scope of the British chemical plant industry.

THE FIRM of Schichau, in Elbing, is reported to have completed successful tests of a motor in which pulverised coal is used as fuel. The feature of the engine is that the fuel is fed to the furnace without the help of an air apparatus, and through the adoption of a specially resistant material wear and tear has been reduced to a degree that promises to be economic. The Schichau production is a single-cylinder motor developing 200 h.p. at 180 revolutions a minute. The tests justified the hope, it is stated, that in the not distant future Germany will have in the pulverised-coal motor an important source of power, burning fuel that does not have to be imported.

FIFTY-ONE AMERICAN DELEGATES are expected to attend the annual meeting of the Society of Chemical Industry at Liverpool next month.

AFTER BEING IN OPERATION since 1903 Nobel's explosive factory at Linlithgow has now closed down. The closing of the factory has been due to the transference of the manufacturing of safety fuses to Stevenston, Ayrshire.

A NEW STEAM BOILER PLANT at the works of S. A. Sadler and Co., Ltd., Middlesbrough, was brought into operation by Alderman Sadler on Wednesday. Alderman Sadler lit the first fire and his wife opened the first valve of the plant, which has been erected by Clarke, Chapman and Co., Ltd.

Chemical Engineering Congress

Intending Members should Register at Once

A LARGE NUMBER of applications for membership of the Chemical Engineering Congress of the World Power Conference, which meets at the Central Hall, Westminster, on June 22-27, has already been received. In order, however, to avoid a last minute rush, with possible delay, intending members who have not yet registered should apply as soon as possible to the general secretary at 56 Victoria Street, S.W.1.

A TOUR OF THE BILLINGHAM WORKS of Imperial Chemical Industries will be made next Thursday by members of the Institution of Mechanical Engineers attending the summer meeting at York. On Tuesday, Mr. F. E. Smith, chief engineer at Billingham, will present a paper on the hydrogenation of bituminous coal for the production of petrol.

THE LEADING RAYON PRODUCERS in the United States have followed the Du Pont Rayon Co.'s reduction of viscose staple and fibre prices by effecting similar "cuts." At the same time it is indicated that importers of foreign spun rayon will likewise announce reductions. The Du Pont Rayon Co. on Monday reduced its prices of viscose staple and fibre by 2 cents to 12 cents per pound, in order to stem the rising tide of Japanese imports.

A DISPUTE AROSE last week between the miners and the management at the Halkyn Lead Mines, Flintshire. All the men employed at the mines, numbering about 650, are now idle. Officials of the Transport and General Workers' Union were invited to go down the mines to see the actual conditions under dispute. The invitation was accepted and Mr. H. T. Edwards, North Wales secretary of the union, with Mr. Bellis, his assistant, and local officials, accompanied by Mr. Richardson and his staff, went down the mines. The tour of inspection underground lasted ten hours. The management has arranged to give facilities to the union officials to examine the company's books, pay-sheets, and any other matter which has a bearing upon the question at issue.

Weekly Prices of British Chemical Products

PRICES of chemical products remain steady in London, with a fair general demand. The only price change announced during the week was a reduction in the price of toluol 90 per cent. which is now 2s. 1d. to 2s. 2d. per gal. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—The Whitsuntide holidays in the Manchester district have exercised a notable influence on operations on the chemical market during the past week and buying interest generally has been at an extremely low ebb. Both buyers and sellers have been in small attendance on the market and the latter report little in the way of fresh business. Deliveries against contracts have also been seriously interfered with in consequence of the closing of consuming works, the average stoppage approaching about half the week, but the outlook for the movement of chemical products during the next few months is regarded as hopeful. In the meantime, the general price position keeps firm so far as the principal heavy materials are concerned, although there are indications of easiness in respect of certain of the by-products.

SCOTLAND.—There has been a steady day to day demand for chemicals for home trade during the week, and rather more inquiry for export. Prices generally continue firm at about previous figures with only slight changes to report.

General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND. £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—40% technical, £16 12s. 6d. per ton. LONDON: Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £48 to £50.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, £28; powdered, £29.

ACID, CHROMIC.—Flaked, 10d. per lb., less 2½%; ground, 10¼d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: 11⅜d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works. barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £48 10s. to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11¼d., less 5%. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 11¾d. to 1s. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £15 per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish £21, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—5s. 1d. to 5s. 4d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£40 to £43 per ton.

LEAD ACETATE.—LONDON: White, £36 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £35, brown, £33 10s.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £26 to £28 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 5s. to £16 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38 10s.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11¼d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¼d. to 8½d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d. to 8½d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £20 15s.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANLHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.— £29 per ton. SCOTLAND: 3¾d. per lb.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHUR.—£9 to £9 5s. per ton. SCOTLAND: £8 to £9.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—£7 5s. per ton for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

CALCIUM CYANAMIDE.—£7 5s. per ton, delivered in 4-ton lots.

NITRO-CHALK.—£7 5s. per ton delivered in 6-ton lots to farmer's nearest station.

NITRATE OF SODA.—£7 12s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 10s. to £10 19s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE (N.P.) FERTILISERS.—£10 5s. to £13 15s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 2s. 5d. to 2s. 7d. per gal.; 99/100%, 3s. to 3s. 6d. per gal., according to specification; pale 98%, 2s. 7d. to 2s. 9d.; dark, 1s. 10d. to 1s. 11d. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 2s. 3d. to 2s. 6d. per gal. MANCHESTER: Crystals, 6¾d. to 7d. per lb.; crude, 2s. 2d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s 3½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5d. SCOTLAND: Specification oils, 4d.; washed oil, 4½d. to 4¾d.; light, 4½d.; heavy, 4¼d. to 4½d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £17 10s. per ton; purified crystals, £25 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PYRIDINE.—90/140%, 5s. to 7s. 6d. per gal.; 90/180, 2s. 3d.

TOLUOL.—90% 2s. 1d. to 2s. 2d. per gal.; pure, 2s. 6d.

XYLOL.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d.

PITCH.—Medium, soft, 37s. 6d. per ton, in bulk at makers works. MANCHESTER: 30s. to 32s. 6d. f.o.b., East Coast.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 15s. to £8 10s. per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £10; grey, £11.

CHARCOAL.—£5 to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £46 to £50 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 1s. 3d. per gal.

WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 3d. per gal.; solvent, 3s. to 4s. per gal.

WOOD TAR.—£2 to £2 10s. per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

o-CRESOL 30/31° C.— 6d. per lb. in 1-ton lots.

p-CRESOL 34-5° C.—1s. 6d. per lb. in ton lots.

m-CRESOL 98/100%.—1s. 7d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DINITROCHLOROBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—9½d. to 11d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

Latest Oil Prices

LONDON, June 3.—LINSEED OIL was steady. Spot, £26 10s. per ton (small quantities); June, £24 2s. 6d.; July-Aug., £24 5s.; Sept.-Dec., £24 7s. 6d.; Jan.-April, £24 10s., naked. SOYA BEAN OIL was quiet. Oriental (bulk), afloat, £21 5s. per ton. RAPE OIL was slow. Crude extracted, £34 per ton; technical refined, £35 10s. naked, ex wharf. COTTON OIL was dull. Egyptian crude, £23 10s. per ton; refined common edible, £26 10s., and deodorised, £28 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was steady. American, spot, 28s. 6d. per cwt.

HULL.—LINSEED OIL, spot, quoted £24 15s. per ton; June and June-Aug., £24 5s.; Sept.-Dec., £24 7s. 6d. COTTON OIL, Egyptian, crude, spot, £23 10s.; edible, refined, spot, £26; technical, spot, £26; deodorised, £28, naked. PALM KERNEL OIL, crude, f.m.q., spot, £20 10s., naked. GROUNDNUT OIL, extracted, spot, £30 10s.; deodorised, £33 10s. RAPE OIL, extracted, spot, £33; refined, £34 10s. SOYA OIL, extracted, spot, £25 10s.; deodorised, £28 10s. per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 42s. 6d. per cwt.; firsts, 37s. 6d.; seconds, 35s. 6d. TURPENTINE, American, spot, 41s. 3d. per cwt.

New Companies Registered

W. F. Metcalf, Ltd., Russell Road, Crowlands, Southport, Lancs.—Registered May 27. Nominal capital £10,000. Chemical manufacturers, dye makers, dyers, bleachers, makers of acids, limes, alkalis and chemicals of all kinds, coal owners, gas makers, tar producers, distillers of tar and ammonia, etc. Directors: Henry G. Parkinson, Wm. F. Metcalf, Chas. E. Metcalf.

Titanine, Ltd.—Registered May 27. Nominal capital £100. To acquire the trade marks "Titanine" and "Emaillite" and to carry on the business of manufacturers of and dealers in dope, varnish, paint, lacquer, and other compositions for application on aeroplanes, seaplanes, hydropanes, flying-boats, airships, balloons and aircraft of all descriptions, chemical manufacturers, etc. A subscriber: Geoffrey L. Howarth, 28 Longton Avenue, S.E.26.

Chemical and Allied Stocks and Shares

SOMEWHAT more cheerful conditions have been in evidence in the stock and share markets. Very little expansion in the volume of business was reported, but sentiment benefited from the better tendency which developed in iron and steel shares in view of the increase in the prices of iron and steel and the good impression created by the dividend of John Brown and Co., which was well in excess of best market expectations. Among shares of chemical and allied companies Imperial Chemical were in larger demand and Courtaulds were again better, both shares having received attention in view of the apparently favourable yields offered on the basis of last year's dividends. In neither case is the market budgeting for much, if any, increase in the divdend for the current year, but it is being assumed that when general market conditions become really buoyant, leading industrial shares such as these may respond strongly. Unilever have been good, but the higher price is being attributed largely to purchases from the Continent as a hedge against any possible devaluation of the franc and the Dutch guilder. It is also being assumed that if Holland were to abandon the gold standard the business of the allied company, Unilever, N. V., might benefit a good deal so far as its large export trade is concerned. B. Laporte kept the higher price made recently and continue to be held firmly on the favourable views of the company's prospects. It is assumed in the market that the business has scope for further considerable growth and that a larger dividend or perhaps another share bonus seems a reasonable expectation. United Molasses were more active, partly because of the possibility of a larger dividend from Distillers, in which the company is a shareholder. The fact that United Molasses has recently resumed payment of an interim dividend has led to the belief that the company is making further encouraging progress and that a good increase in the total dividend for the year is not unlikely. Distillers have come in for attention on any reaction; some market men continue to be confident that the long-hoped-for share bonus will be forthcoming this year. Salt Union were rather dull. Imperial Smelting Corporation were fairly steady aided by the belief that if market hopes of a 5 per cent. dividend for the year are borne out, there would apparently be scope for satisfactory appreciation in the shares above their present level. Borax Consolidated deferred shares were active on current dividend estimates in the market, reference to which has been made before. The 6 per cent. cumulative £5 preferred ordinary shares yield nearly 5½ per cent. at their present price, which seems unduly large having regard to the company's good balance sheet position and the higher level of profits shown by the last report. It may be that the shares are not obtainable in any amount around their current list price. Johnson, Matthey preference shares were again unchanged. They continue to be held very tightly in view of the high level of the company's earning capacity and do not often change hands. Fison, Packard and Prentice were steady. Despite the fact that the interim dividend was not increased the current market view is that prospects of a larger total dividend for the year seem to be good. Cooper, McDougall and Robertson also show no change. The company is usually regarded as being well placed to benefit a good deal from better conditions in the Argentine and other export markets where it has important business. Last year's profits were struck on a very conservative basis and it may be recalled that it was pointed out by the directors that they did not really reflect the full earning capacity shown. Reckitt and Sons were again steady at 115s. In view of the company's strong balance sheet and large reserves it is usually assumed that it is likely to distribute a share bonus in the future, but this may not be until conditions for international trade are a good deal better as the company does a considerable business overseas and abroad. Goodlass Wall remained dull. Boots Pure Drug were again steady. Benzol and By-Products preference again changed hands around 4s. 9d. British Glues and Chemicals have continued to be held firmly on dividend hopes, as have the preference which may benefit from their participating dividend rights this year. Burt, Boulton and Haywood were again unchanged. British Oxygen received a good deal more attention, having remained under the influence of the statements at the recent meeting. Cellulose Acetate have been out of favour in view of fears that the directors may again deal conservatively with profits and not pay a dividend. Consett Iron shares were active as were the majority of iron, steel and allied shares which benefited from the higher iron and steel prices. Oil shares were less active, the disposition being to await the forthcoming annual reports.

Name.	June 3.	May 27.
Anglo-Iranian Oil Co., Ltd. Ord.	85/7½	86/3
Associated Dyers and Cleaners, Ltd. Ord.	1/3	1/3
Associated Portland Cement Manufacturers, Ltd. Ord.	87/6	85/7½
,, 5½% Cum. Pref.	28/9	28/9
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	6/3	6/3
Berger (Lewis) & Sons, Ltd. Ord.	68/9	68/1½
Bleachers' Association, Ltd. Ord.	5/-	5/-
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	20/-	20/-
Boots Pure Drug Co., Ltd. Ord. (5/-)	53/6	53/-
Borax Consolidated, Ltd., Pfd. Ord. (£)	110/-	110/-
,, Defd. Ord.	28/1½	28/1½
,, 5½% Cum. Pref. (£10)	£11/17/6	£11/17/6
Bradford Dyers' Association, Ltd. Ord.	7/7½	7/10
British Celanese, Ltd. 7% 1st Cum. Pfd.	23/-	23/-
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/9	5/9
British Cyanides Co., Ltd., Ord. (2/-)	3/6	3/6
British Drug Houses, Ltd. Ord.	20/-	20/-
,, 5% Cum. Pref.	22/6	22/6
British Glues and Chemicals, Ltd. Ord. (4/-)	9/3	9/6
,, 8% Pref. (Cum. and Part.)	30/-	30/-
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/9	49/-
British Oxygen Co., Ltd. Ord.	96/3	87/6
,, 6½% Cum. Pref.	34/4½	34/4½
British Portland Cement Manufacturers, Ltd. Ord.	93/9	92/6
Bryant & May, Ltd. Pref.	67/6	67/6
Burt, Boulton & Haywood, Ltd. Ord.	21/3	21/3
,, 7% Cum. Pref.	28/9	28/9
,, **6% 1st Mort. Deb. Red. (£100)**	**£102/10/-**	**£102/10/-**
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	108/9	108/9
,, 4% 1st Mort. Deb. Red. (£100)	£94/10/-	£94/10/-
Calico Printers' Association, Ltd. Ord.	7/1½	6/10½
Cellulose Acetate Silk Co., Ltd. Ord.	12/10	10/3½
Consett Iron Co., Ltd. Ord.	10/-	8/9
Cooper, McDougall & Robertson, Ltd. Ord.	33/9	33/9
,, 7% Cum. Pref.	28/9	28/9
Courtaulds, Ltd. Ord.	51/10½	49/4½
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
Distillers Co., Ltd. Ord.	102/-	102/-
,, 6% Pref. Stock Cum.	31/6	31/6

Name.	June 3.	May 27.
Dorman Long & Co., Ltd. Ord.	32/6	31/-
English Velvet & Cord Dyers' Association Ltd. Ord.	3/9	3/9
Fison, Packard & Prentice, Ltd. Ord.	44/4½	44/4½
,, 7% Non-Cum. Pref.	31/3	30/10½
,, **4½% Debs. (Reg.) Red. (£100)**	**£106**	**£106**
Gas Light and Coke Co.	28/3	28/3
,, 4% Consolidated Pref. Stock (£100)	£106/10/-	£106/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	12/6	12/6
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	28/9	28/9
Gossage, William, & Sons, Ltd. 6½% Cum. Pref.	24/4½	24/4½
Imperial Chemical Industries, Ltd. Ord.	39/4½	38/6
,, Deferred (10/-)	9/7½	9/4½
,, 7% Cum. Pref.	34/7½	34/9
Imperial Smelting Corporation, Ltd. Ord.	16/3	16/3
International Nickel Co. of Canada, Ltd.	$47¼	$46⅝
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	105/-	105/-
Laporte, B., Ltd. Ord.	115/-	115/-
Lawes Chemical Co., Ltd. Ord. (10/-)	8/9	8/9
,, **7% Non-Cum. Part Pref. (10/-)**	10/-	10/-
Lever Bros., Ltd. 7% Cum. Pref.	34/-	34/-
Magadi Soda Co., Ltd. 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£35	£35
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, **7½% Cum. Pref.**	**1/6¾**	**1/6¾**
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	46/6	46/-
Potash Syndicate of Germany 7% Gld. Ln. Sr. "A" and "B" Rd.	£78	£77
Reckitt & Sons, Ltd. Ord.	115/-	115/-
Salt Union, Ltd. Ord.	42/6	42/6
,, Pref.	47/6	47/6
South Metropolitan Gas Co. Ord. (£100)	£124/10/-	£125/10/-
Staveley Coal and Iron Co. Ltd. Ord.	51/10½	52/6
Stevenson & Howell, Ltd. 6½% Cum. Pref.	**26/3**	**26/3**
Triplex Safety Glass Co., Ltd. Ord. (10/-)	93/1½	91/3
Unilever, Ltd. Ord.	32/6	31/10½
United Glass Bottle Manufacturers, Ltd. Ord.	44/6	47/6
United Molasses Co., Ltd. Ord (6/8)	23/1½	23/1½
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	10/-	10/3

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

COMPOSITIONS COMPRISING CELLULOSE ESTERS, manufacture.—I. G. Farbenindustrie. Nov. 11, 1933. 447,131.

COLOURING ACETATE ARTIFICIAL SILK, process.—Imperial Chemical Industries, Ltd., P. G. Carter, R. H. Sennett, and C. Shaw. Nov. 12, 1934. 447,134.

GLYOXAL SULPHATE, manufacture.—E. I. du Pont de Nemours and Co. Nov. 10, 1933. 447,135.

CRACKING OF DISTILLATES from coal-oil mixtures.—J. L. Strevens, and W. B. Mitford. Nov. 13, 1934. 447,328.

CELLULOSE ETHER COMPOSITIONS.—Du Pont Viscoloid Co. Dec. 28, 1933. 447,337.

PICOLINIC ACID AND SALTS thereof, manufacture.—E. I. du Pont de Nemours and Co. Nov. 15, 1933. 447,339.

VAT DYESTUFFS, manufacture.—I. G. Farbenindustrie, and W. W. Groves. Nov. 19, 1934. 447,286.

VALUABLE HYDROCARBONS by the heat treatment of carbonaceous materials in presence of halogens or their compounds. Coutts and Co., and F. Johnson (legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Dec. 10, 1934. 447,210.

HALOGEN DERIVATIVES OF UNSATURATED STEROLS, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Dec. 29, 1934. 447,212.

DYEING OR PRINTING FIBROUS MATERIAL, process.—Soc. of Chemical Industry in Basle. Jan. 23, 1934. 447,349.

MOULDED SALT MIXTURES, production.—Kali-Forschungs-Anstalt Ges. Jan. 26, 1934. 447,215.

DYEING OR PRINTING FIBROUS MATERIAL, process.—Soc. of Chemical Industry in Basle. Jan. 30, 1934. 447,351.

VIOLET TO BLUE DYEINGS on vegetable fibre, production.—Soc. of Chemical Industry in Basle. Apr. 14, 1934. 447,224.

CONTINUOUS HYDROGENATION and other catalytic reactions, method of effecting.—I. Seto, and M. Sato. Apr. 8, 1935. 447,159.

HETERO-CYCLIC COMPOUNDS, process for the manufacture.—Schering-Kahlbaum Akt.-Ges. Apr. 17, 1934. 447,226.

N-SUBSTITUTION PRODUCTS OF 1:4-DIAMINO-ANTHRAQUINONES, manufacture and production.—W. W. Groves, and Coutts and Co., and F. Johnson (legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). May 3, 1935. 447,088.

DYEING OR PRINTING ACETYL CELLULOSE, process.—W. W. Groves (I. G. Farbenindustrie). Aug. 3, 1934. 447,090.

3:5:8:10-TETRA-AROYLPYRENES, manufacture.—Soc. of Chemical Industry in Basle. July 11, 1934. 447,096.

BARBITURIC-ACID COMPOUNDS, production.—F. Taeschner, K. E. Taeschner, and M. Dobroschke (trading as Taeschner Chemisch-Pharmazeutische Fabrik, E.), and W. Ursum. Nov. 13, 1935. 447,245.

CELLULOSE DERIVATIVE MOISTURE-PROOFING COMPOSITIONS.—M. F. Monbiot. Nov. 16, 1935. 447,371.

MAGNESIA POOR IN LIME from dolomite, manufacture and production.—G. W. Johnson (Klöckner-Werke). Nov. 22, 1935. 447,246.

AZO DYESTUFFS, manufacture.—A. Carpmael (I. G. Farbenindustrie). Aug. 27, 1935. 447,251.

ANTHRAQUINONE DERIVATIVES, manufacture.—W. W. Groves, and Coutts and Co., and F. Johnson (legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Aug. 3, 1934. 447,107.

ANTHRAQUINONE DERIVATIVES, manufacture.—W. W. Groves, and Coutts and Co., and F. Johnson (legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). Aug. 3, 1934. 447,108.

PHOSPHATIDE CONDENSATION PRODUCTS.—J. Talalay, and Magna Rubber Co., Ltd. Sept. 10, 1934. 447,256.

REACTION PRODUCT OF BUTADIENE BODIES with hydrogen chloride and method of producing the same. Marsene Corporation of America. Dec. 23, 1933. 447,110.

Specifications Accepted with Date of Application

2-AMINO-3-BROMOANTHRAQUINONE-SULPHONIC ACID, manufacture.—W. W. Groves (I. G. Farbenindustrie). Nov. 6, 1934. 446,828.

AMINOALKYL-SULPHONIC ACIDS, manufacture.—W. W. Groves (I. G. Farbenindustrie). Nov. 6, 1934. 446,829.

SYMMETRICAL DI (ARYLAMINO)-HYDROXYBENZENES, manufacture.—I. G. Farbenindustrie. Nov. 7, 1933. 446,906.

UNSATURATED ORGANIC COMPOUNDS, manufacture.—J. W. C. Crawford and Imperial Chemical Industries, Ltd. Nov. 7, 1934. 446,908.

ANTHRAQUINONE VAT DYESTUFF, manufacture.—Imperial Chemical Industries, Ltd., F. Irving and C. Shaw. Nov. 7, 1934. 446,910.

TREATING FIBROUS MATERIALS, process.—I. G. Farbenindustrie. Nov. 9, 1933. 446,976.

FLUORESCENT MATERIALS and fluorescent screens made therewith. Chemische Fabrik Von Heyden, A.-G. Nov. 18, 1933. 446,765.

PRODUCTION OF CRYSTALS.—Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., W. J. Chadder and H. M. Spiers. Jan. 29, 1935. 446,988.

ORGANIC SULPHUR COMPOUNDS, manufacture and production.—Coutts and Co. and F. Johnson (Legal representatives of J. Y. Johnson (deceased)) (I. G. Farbenindustrie). Feb. 15, 1935. 446,992.

OLEFINES, hydration.—Standard Oil Development Co. July 28, 1934. 446,781.

EDIBLE OILS AND EDIBLE FATS, process for manufacture.—Ges. Zur Verwertung Fauth'scher Patente. April 10, 1934. 446,997.

PHENYL MERCURY NITRATES, process for manufacture.—W. P. Williams (Schering-Kahlbaum, A.-G.). March 20, 1935. 446,703.

CRACKED GASOLINE having low gum content, production.—Naamlooze Vennootschap Nieuwe Octrooi Maatschappij. July 17, 1934. 446,711.

ZINC WHITE, production.—Zahn and Co., Ges. July 9, 1934. 447,003.

OILS AND PARAFFIN WAX, process for manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 6, 1934. 446,716.

CONTROLLING GASEOUS REACTIONS.—W. W. Triggs (E. I. du Pont de Nemours and Co.). Aug. 2, 1935. 446,720.

ESTERS OF CELLULOSE, production.—British Celanese, Ltd. Sept. 29, 1934. 446,949.

ESTERS OF CELLULOSE, manufacture.—British Celanese, Ltd. Sept. 29, 1934. 446,723.

FILM EVAPORATION OF LIQUIDS, processes and apparatus.—Chemische Fabrik Budenham, A.-G. March 25, 1935. 447,028.

AMINO-CARBOXYLIC ACIDS of capillary action, manufacture.—W. W. Groves (I. G. Farbenindustrie). Aug. 21, 1933. 446,813.

Applications for Patents

MIXED FERTILISER from ammonium sulphide, etc., production.—G. W. Johnson (I. G. Farbenindustrie). 12933.

COMPOUNDS OF 1:9-ANTHRAQUINONE SERIES, production.—G. W Johnson (I. G. Farbenindustrie). 13281.

INTERMEDIATES AND CYANINE DYES, production.—J. D. Kendall 13465.

PROCESS FOR MAKING PHENOL, ETC.—I. Kreidl. (Austria, May 15, '35.) 13018.

α-METHYLACROLEIN, preparation.—Röhm and Haas, A.-G. (Germany, May 18, '35.) 13484.

ESTERS OF POLYCYCLIC ALCOHOLS, manufacture.—Schering-Kahlbaum, A.-G. (April 8, '35.) 13085, 13086.

OLEFINES, polymerisation.—Standard Alcohol Co. (United States, June 13, '35.) 13242.

RECOVERY OF MAGNESIUM from magnesium oxides.—Dr. A. Wacker Ges. für Elektrochemische Industrie. (Germany, May 22, '35.) 13051.

TREATMENT OF ARTICLES with volatile organic solvents.—Dr. A. Wacker Ges. für Elektrochemische Industrie. (Germany, Nov. 7, '35.) 13053.

PREGNANOLONES, manufacture.—W. P. Williams (Schering-Kahlbaum, A.-G.). 13468.

PETROL, ETC., from coal, etc., production.—S. L. Wyndham. 12903.

PETROL, ETC., from coal, etc., production.—Wyndhams Liquid Coal Co., Ltd. 12903.

NITRO-CELLULOSE, manufacture.—Zellstofffabrik Waldhof. (Germany, June 11, '35.) 12885.

ELECTRODEPOSITION OF METALS.—H. H. Armstrong. (United States, May 18, '35.) 14009.

ANHYDRIDES OF UNSATURATED ACIDS, manufacture.—H. A. Auden, H. P. Standinger and Distillers Co., Ltd. 14094.

CELLULOSE DERIVATIVE COMPOSITIONS, manufacture. H. A. Auden, H. P. Standinger and Distillers Co., Ltd. 14095, 14096. 14096.

GLYCOLS FROM OXIDES OF OLEFINES, preparation.—F. Berbé, C. Vandendries, P. Ferrero, and Soc. Carbochimique Soc. Anon. 14165.

POLYMERIZATION PRODUCTS OF OLEFINES, manufacture.—A. Carpmael (I. G. Farbenindustrie). (Dec. 20, '34.) 14097, 14098.

PYRIMIDINE COMPOUNDS, manufacture.—A. Carpmael (I. G. Farbenindustrie.) (Dec. 20, '34.) 14200, 14201.

MAGNESIUM ALLOY.—F. Christen. (Switzerland, May 15, '35.) 13791.

PRODUCTION OF STARCH.—F. W. Cleveland. 13677.

HEAT-TREATMENT OF METALS.—J. H. Crossley. 14279.

POLYMERISATION PRODUCTS, manufacture.—F. B. Dehn (Röhm and Haas A. G.). 14069.

ESTERS OF ACIDS OF ACRYLIC SERIES, production.—E. I. du Pont de Nemours and Co. (United States, May 16, '35.) 13858.

SYNTHETIC RESINS, manufacture.—E. I. du Pont de Nemours and Co. (United States, May 16, '35.) 13859.

CELLULOSE DERIVATIVE COATING COMPOSITIONS.—E. I. du Pont de Nemours. (United States, June 27, '35.) 13860.

TREATMENT OF HYDROCARBONS.—Edeleann Ges. (United States, May 15, '35.) 13693.

CONDENSATION PRODUCTS, manufacture.—Fahlberg-List A. G. Chemische Fabriken. (Germany, May 21, '35.) 13692.

PROCESS FOR CHLORINATING HYDROCARBONS.—W. W. Groves (I. G. Farbenindustrie.) 13690.

VAT-DYESTUFFS OF THE ANTHRAQUINONE SERIES, manufacture.—W. W. Groves (I. G. Farbenindustrie.) 13691.

METHOD OF REALISING CHEMICAL REACTIONS.—W. W. Groves (I. G. Farbenindustrie.) 14181.

2-OXYNAPHTHALENE-DI-CARBOXYLIC ACIDS, manufacture.—W. W. Groves (I. G. Farbenindustrie.) 14183.

ZINC SULPHIDE, manufacture.—Hercules Powder Co. (United States, May 21, '35.) 14050.

NAPHTHA REFORMING.—Houdry Process Corporation. (United States, May 27, '35.) 13678.

QUINONE AND HYDROQUINONE, production.—Imperial Chemical Industries, Ltd., H. Palfreeman. 13667.

Company News

English Beet Sugar Corporation.—An interim of 15 per cent., tax free, has been declared for the year to March 31 last.

International Nickel Co. of Canada.—The quarterly dividend is announced on the preferred stock at the rate of 7 per cent. per annum, payable on August 1, 1936, to holders of record July 2.

Canadian Celanese.—The directors have declared a dividend of 40 cents a share on the common stock. The company in March declared its maiden dividend on this stock, also of 40 cents. The quarterly dividend of $1.75 per share on the 7 per cent. cumulative participating preferred stock for the three months to June 30 is also announced. Both dividends are payable June 30 to holders of record on June 23.

Turner and Newall, Ltd.—The directors have decided to declare an interim dividend on account of the year ending September 30, 1936, on the issued ordinary stock at 3¾ per cent., less tax at 4s. 9d., payable on July 25, 1936. This compares with 2½ per cent. paid a year ago, which was followed with a final of 10 per cent., making 12½ per cent., against 10 per cent. in the previous year.

J. C. and J. Field.—The net earnings for the year to March 31 last are up from £19,357 to £30,143, and after bringing in £9,989 there is a disposable balance of £40,133. The ordinary dividend is 12½ per cent.—in the previous year the dividend was 10 per cent. accompanied by a 2½ per cent. bonus—and £5,000 goes to reserve for contingencies and tax account. The carry-forward is increased from £9,989 to £10,758.

Yorkshire Dyeware and Chemical Co.—The report for the year to March 31 last shows that after providing for depreciation and directors' fees, etc., and setting aside £4,000 to form nucleus of research fund, the profit amounts to £27,378, against £26,751 in the previous year. To this is added £6,856 brought in, making £34,234. To debenture interest is placed, less tax, £3,959; interim dividend, less tax, £3,875, leaving £26,399. A final dividend of 7½ per cent., plus bonus of 5 per cent., making 15 per cent., less tax, is announced, leaving to go forward, £7,337.

Forthcoming Events

LONDON

June 8.—Royal Institution. General meeting of members. 5 p.m. 21 Albemarle Street, London.

June 10.—Electrodepositors' Technical Society. "The Production of Nickel Sheets and Tubes by Deposition." A. I. Wynne-Williams. 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, London.

Books Received

British Chemical Plant Manufacturers' Association, Official Directory. 1936. London: Pp. 140.

Platinum and Allied Metals. London: Imperial Institute. Pp. 40. 3s.

A Shellac Patent Index. By R. W. Aldis. India: Indian Lac Research Institute. Pp. 115. Rs. 2s. 8d.

Hofmann Memorial Lecture, 1936. By Professor G. T. Morgan. London: MacMillan and Co., Ltd. Pp. 66. 1s.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt as specified in the last available Annual Summary, is also given marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ATTOCK OIL CO., LTD., London, E.C. (M., 6/6/36.) Registered May 21, series of £200,000 debentures, present issue £50,000; general charge (except moneys of Provident Fund, etc.). *Nil. July 11, 1935.

BROWNS CHEMISTS (STOKE-ON-TRENT) LTD. (M., 6/6/36.) Registered May 19, debenture to Barclays Bank Ltd., securing all moneys due or to become due to the Bank; general charge. *£700. October 14, 1935.

J. M. HUGHES, LTD., High Wycombe, manufacturing chemists, etc. (M., 6/6/36.) Registered May 25, series of £2,000 debentures, present issue £1,000; general charge. *——. October 22, 1935.

THOMAS TYRER AND CO., LTD., London, E., manufacturing chemists. (M., 6/6/36.) Registered May 19, £3,300 charge, to Dr. H. H. Scott, 18 Ridgmount Gardens, W.C.; general charge. *Nil. January 13, 1936.

Satisfaction

LEVER BROTHERS LTD., Port Sunlight, soap manufacturers. (M.S., 6/6/36.) Satisfactions registered May 25, of Trust Deed registered May 4, 1932, to extent of £68,800, and of Trust Deed registered November 1, 1932, to extent of £15,763.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

COOPER, NEVILLE (trading as Dorothee Dyes), 35 Clayton Street and St. Silas Road, Blackburn, maker of packet dyes. (C.C., 6/6/36.) £10 6s. 8d. April 30.

SPRING VALE COLOUR CO., LTD., Spring Vale Works, Spring Vale, Darwen, paint manufacturers. (C.C., 6/6/36.) £33 6s. 10d. April 29; £96 13s. 6d. May 1.

Companies Winding-up Voluntarily

TITANINE-EMAILLITE, LTD. (C.W.U.V., 6/6/36.) By special resolutions, May 26, for purpose of reconstruction and formation of a new company under the title of "Titanine, Ltd." Mr. Douglas Winter, 39 St. James's Street, London, S.W.1, appointed liquidator

SHEFFIELD CHEMICAL CO., LTD. (C.W.U.V., 6/6/36.) By special resolution, May 29, for purpose of reconstruction; members' voluntary winding-up. Mr. Albert Cleathero, of Don Vitriol Works, Attercliffe, Sheffield 9, appointed liquidator.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Canada.—A Toronto firm of manufacturers' representatives desires the agency of a United Kingdom firm manufacturing tin oxide for use in the enamelling industry, for the Province of Ontario. (Ref. No. 458.)

Switzerland.—An agent established at Geneva wishes to obtain the representation, on a commission basis, of United Kingdom exporters of industrial oils. (Ref. No. 471.)